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PROBLEMS IN THE TREATMENT OF ADVANCED TUBERCULOSIS IN A MUNICIPAL HOSPITAL

BASED ON AN ANALYSIS OF THE COURSE OF DISEASE AND RESULTS OF PNEUMOTHORAX TREATMENT

HERMAN EPSTEIN, M.D.
AND
H. W. HETHERINGTON, M.D.
PHILADELPHIA

From the point of view of the public health, isolation and treatment of patients with clinical disease constitute important factors in the control of tuberculosis. Many patients prefer to remain at home under the care of private physicians or clinics, a procedure that may be justified if sputum can be kept negative for tubercle bacilli or if adequate measures are taken for the protection of persons in contact. For the majority of patients, however, institutional care is advised. Most communities provide sanatorium facilities for patients with more favorable prognosis. Infectious patients with advanced disease and less favorable prognosis are usually cared for in special wards of local hospitals, the major objective being the removal of these individuals from contact with the community.

In some municipalities, collapse therapy is employed as a partial solution of the lack of sanatorium facilities. Suitable patients are admitted to an institution until collapse is established. If the sputum is rendered negative or if a satisfactory collapse appears probable, the patient is discharged to a dispensary for the continuation of artificial pneumothorax with rest in bed at home and the supervision of public health nurses to supplement the treatment. Through the use of so-called ambulatory pneumothorax, sanatorium waiting lists are relieved and the number of sputum-positive patients in the community is reduced. Hruby [1] recently reported the extent to which this method of tuberculosis control is employed in Chicago. Although it is not ideal treatment, its value is to some extent proportional to the lack of beds for institutional care.

It is a problem to know to what extent treatment, particularly collapse therapy, should be applied in the hospital to patients admitted primarily for purposes of isolation. To patients with advanced tuberculosis whose prognosis is apparently hopeless there is a tendency to apply artificial pneumothorax because it is felt that the patient will surely die without some form of "active" treatment. Collapse therapy is instituted in the hope that improvement, however improbable, may be the result. In over zealous efforts to help these patients, more harm than good may be done. In this paper an attempt has been made to determine the indications and limitations of collapse therapy for patients in the tuberculosis wards of a large city hospital.

A series of 504 patients discharged consecutively from one of the services of the Department of Tuberculosis of the Philadelphia General Hospital during the three year period 1935-1937 has been reviewed. Pulmonary tuberculosis was diagnosed in 441, or 87.7 per cent, of cases.

Artificial pneumothorax was attempted in 137 instances, but in seventeen of these no free pleural space was found. The remaining 120 cases in which pneumothorax was established constituted 27 per cent of the cases of pulmonary tuberculosis. Table 1 shows the stage of disease and the results of sputum examinations on admission of the patients to the hospital in the total group and in those in whom pneumothorax was subsequently established. The great majority of patients, 352, or 79.9 per cent, had far advanced lesions.

Tubercle bacilli were found in the sputum of 377, or 85.4 per cent, of the total group and in 106, or 88.3 per cent, of the pneumothorax group. The large number of patients with far advanced, sputum-positive disease stresses the importance of a city hospital in the removal of foci of infection from the community. It likewise follows that pneumothorax is indicated in a relatively small proportion of cases and that the value of this form of therapy is limited.

Unfortunately many patients with sputum-positive tuberculosis fail to remain in the hospital and return to their homes, where they act as foci for the further spread of the disease. Of the 441 tuberculous patients 247, or 56 per cent, remained in the hospital less than ten weeks, 392, or 87 per cent, remained less than seven months and twenty-seven, or only 6 per cent, remained more than one year.

Table 2 shows the reasons for discharge of white and colored patients in both the total and the pneumothorax groups. Death occurred in the hospital in 190, or 43 per cent, of patients. It was the cause of discharge of 33 per cent of white and 52 per cent of colored patients.

Of the white patients 28 per cent and of the colored patients 31 per cent left the hospital against advice. However, these percentages, which are almost equal, require further analysis. After subtracting the discharges due to death there remain 142 white and 109 colored patients who either accepted treatment or left against advice. It now appears that sixty, or 40 per cent, of the 142 white patients and seventy-one, or 65 per cent, of the 109 colored patients left against advice, a fact showing that actually there is a decided differ-

From the Philadelphia General Hospital and the Henry Phipps Institute of the University of Pennsylvania.

1. Hruby, Allan J.: Collapse Therapy of Tuberculosis, Am. Rev. Tuberc. **40**: 255 (Sept.) 1939.

ence between the two groups. It is the large number of patients who leave against advice that limits the value of the hospital in its function of protecting the community.

Artificial pneumothorax was attempted in 137, or 31 per cent, of the 441 tuberculous patients, and some degree of collapse was obtained in 120, or 27 per cent. It has already been intimated that not infrequently this form of treatment was tried because the prognosis with

TABLE 1.—*Extent of Disease, with Results of Sputum Examinations*

	Total			Pneumothorax		
		Sputum Positive			Sputum Positive	
	Number	Number	Per Cent	Number	Number	Per Cent
Minimal	24	9	37.5	1	0	0
Moderately advanced	65	39	60.0	18	12	66.6
Far advanced	352	329	93.4	101	94	93.0
Total	441	377	85.4	120	106	88.3

rest treatment alone was considered to be very poor. In table 3 the degree of selective collapse in the 137 cases in which pneumothorax was attempted is indicated. This was evaluated by x-ray examination at the time of optimal collapse, obtained by pneumothorax alone or with the aid of pneumonolysis. As shown in table 3, there was no significant difference between white and colored patients in the probability of obtaining a good collapse. A satisfactory anatomic collapse of the diseased portion of the lung was shown by x-ray examination in twenty-six, or 19 per cent, of patients; that is, approximately one in five.

RESULTS OF PNEUMOTHORAX TREATMENT

Most authorities are of the opinion that the results of treatment should be evaluated only after a five year period of observation. In the type of hospital patient with which we are dealing it is difficult to fulfil this requirement. Since the majority remained under observation for only a short time, it was decided to separate patients into two groups, depending on the length of hospitalization. Ten weeks was arbitrarily chosen, because if the period was longer the number of patients remaining for whom results could be evaluated would be too small. Although ten weeks is a very short period, it should be pointed out that of the seventy-seven patients for whom the results of pneumothorax treatment have been evaluated, sixty-five, or 84 per cent, were under observation for more than five months and forty-one, or 53 per cent, were under observation from one to five years.

There were eighty-eight patients in whom pneumothorax was attempted who were under observation for more than ten weeks, including eleven in whom no space was obtained and seventy-seven in whom pneumothorax was continued. In evaluating the results of pneumothorax treatment, only these seventy-seven patients are considered. Although this constitutes a very small series in comparison with others that have been reported from institutions for the care of tuberculosis, it is believed that the series here under consideration merits report as an indication of what may be expected in the tuberculosis wards of a large general hospital under the conditions obtaining today.

In table 4 the results of treatment in the seventy-seven cases are considered in relation to the type of pneumothorax space. The results of treatment were determined by x-ray examination and by clinical criteria. In sixty-four instances there were open cavities, of which twenty-two, or 34 per cent, were apparently closed by collapse therapy. Of the sixty-seven patients with positive sputum twenty-one, or 31 per cent, became sputum negative. The sedimentation rate showed improvement in 64 per cent, and there was a gain in weight in 53 per cent of patients.

It has already been shown that approximately one in five of all patients on whom pneumothorax was attempted obtained a satisfactory collapse. It is among the small number of patients who received a good collapse that most satisfactory results followed, improvement occurring in 87 per cent. On the other hand, only 29 per cent of those with a fair space and 23 per cent of those with a poor space were improved. It is interesting to note that of the eleven patients observed more than ten weeks in whom pneumothorax could not be established, three, or 27 per cent, were improved, this percentage being approximately the same as the percentages found for patients with a poor or a fair pneumothorax space. The group in whom pneumothorax was established was made up of thirty-two colored and forty-five white patients. Analysis of the records of the eight colored patients who improved shows that six had a good collapse and two had a fair collapse, while no patient with a poor collapse had this result. On the other hand, of the twenty-eight white patients who improved, thirteen, or 46 per cent, had a good collapse, ten, or 36 per cent, had a fair collapse and five, or 18 per cent, had a poor collapse.

In an attempt to control widespread disease, bilateral pneumothorax was given in sixteen, or 21 per cent, of seventy-seven cases that are being discussed. Eight of these patients were improved, all of them having been under observation for more than two years. In six instances there was a good bilateral collapse and in two instances there was a good collapse on one side and a fair collapse on the opposite side. On the other hand, of the eight patients who were unimproved, only two had a satisfactory bilateral collapse. One of these was under observation for ten weeks only, while the other, after making an excellent improvement for more than two years, died suddenly of heart failure. Accordingly, it is apparent that every patient who improved had an anatomically satisfactory bilateral collapse, while of those who were unimproved this was true of only two of eight patients.

TABLE 2.—*Disposition of Patients on Discharge*

	Total			Pneumothorax		
	White	Colored	Combined	White	Colored	Combined
Died						
Number	70	120	190	5	19	24
Per cent	33%	52%	43%	7%	34%	20%
Discharged with consent						
Number	55	26	81	30	13	43
Per cent	26%	11%	18%	48%	23%	36%
Discharged to sanatorium						
Number	24	10	34	12	6	18
Per cent	11%	4%	8%	19%	11%	15%
Discharged against advice						
Number	60	71	131	17	18	35
Per cent	28%	31%	29%	26%	32%	29%
Total						
Number	212	229	441	64	56	120
Per cent	100%	100%	100%	100%	100%	100%

The results with the seventy-seven patients with artificial pneumothorax, including sixteen whose treatment was bilateral, indicate, therefore, that a pneumothorax with an anatomically satisfactory collapse is an important factor in controlling the disease and that in the

absence of an anatomically satisfactory collapse improvement is not likely to occur. If this fact is borne in mind it will help to determine where useful work ends and useless work begins.

COMPLICATIONS OF PNEUMOTHORAX TREATMENT

In order to determine the advisability of pneumothorax treatment in the type of patient under consideration, it is necessary to discuss the frequency with which

TABLE 3.—*Distribution of 137 Patients According to the Character of Collapse of the Diseased Lung*

	White		Colored		Total	
	Number	Per Cent	Number	Per Cent	Number	Per Cent
No collapse	10	7	7	5	17	12
Poor collapse	26	19	20	14	46	34
Fair collapse	26	19	22	15	48	35
Good collapse	15	11	11	8	26	19
Total	77	56	60	42	137	100

complications are apt to occur. In this series there was one instance of pleural shock. After being apparently dead the patient recovered following artificial respiration and intracardiac injection of epinephrine hydrochloride. Spontaneous pneumothorax of seven patients as a result of treatment in the hospital occurred. Two patients died of this complication, a third developed empyema and another developed a massive effusion, while the remaining three suffered no serious effects.

The most frequent complication affecting pneumothorax is adhesions between the visceral and parietal pleura. Of the 137 patients in whom pneumothorax was attempted, seventeen had no free pleural space. Of the remaining 120 patients forty-one, or 34 per cent, had adherent pleura, in most instances sufficiently extensive to interfere with obtaining a satisfactory collapse. There were an additional thirty-seven patients with adhesions of clinical significance, about one third of whom received pneumonolysis. In other words, a total of seventy-eight, or 65 per cent, of those who received pneumothorax treatment had either adherent pleura or adhesions interfering, to some extent at least, with collapse. Progressive obliterative pleuritis occurred in twelve cases during the period of our observation. Preceding the adhesive pleuritis, a free pleural space had been present in four instances, while eight had been complicated by adhesions or adherent pleura.

During hospital observation fluid in the pleural cavity, sufficient in amount to be of clinical significance, occurred in twenty-two, or 18 per cent, of those receiving pneumothorax, eight of these patients requiring aspiration. In fifteen, or 12.5 per cent, of cases there was a small amount of fluid confined to the costodiaphragmatic sulcus. The total number in which fluid was noted was thirty-seven, or 31 per cent.

Cardiac embarrassment due to pneumothorax treatment not infrequently occurs, as a result either of overcollapse or of cardiac displacement. Overcollapse is more likely to occur in spontaneous pneumothorax, in bilateral collapse or in unilateral collapse in which there is insufficient functioning lung, usually due to extensive disease on the opposite side. There were three deaths due to cardiac failure. These three cases emphasize the importance of bearing in mind constantly that pneumothorax treatment does not affect the lungs alone but the cardiorespiratory mechanism. It is important not to think entirely in terms of anatomic collapse, overlooking the significance of the physiologic changes produced.

Twenty-four of the 120 patients who received pneumothorax treatment died. The causes of death may be divided into two groups: progression of the tuberculous disease, and complications arising as the result of collapse therapy. There were fifty patients whose disease continued to progress during the course of treatment. Of these, seventeen died in the hospital as a result of the progression. Of the seven patients that died of complications, four died of spontaneous pneumothorax; in two instances they had been admitted with this condition following treatment elsewhere. The three remaining deaths were due to heart failure, one following a fourth stage thoracoplasty. In other words, of the seven patients four, or 3.3 per cent of the total, died of complications resulting from pneumothorax treatment given in the hospital.

The information in the preceding paragraphs indicates that complications are relatively common among patients with advanced disease. Since complications may nullify the value of treatment, the frequency with which they occur should be taken into consideration in attempting to decide the advisability of pneumothorax treatment of these patients.

SUMMARY AND COMMENT

The principal function of local hospitals for tuberculosis is to remove from the community patients with far advanced disease, this being part of the general plan of preventing the spread of tuberculosis by isolation of sources of infection. These patients with poor prognosis present a difficult therapeutic problem. It is important to decide the extent to which treatment is advisable in order to determine the point at which useful work ends and useless work begins. Particularly in the application of collapse therapy, much time may be spent by the physician doing discouraging work that not only fails to benefit the patient but may be actually harmful.

A series of 504 patients discharged consecutively from one of the services of the Department of Tuberculosis of the Philadelphia General Hospital has been analyzed. Many of the patients were admitted in a hopeless condition, since this department of the hospital is intended to treat patients considered unsuitable for sanatorium care. Approximately 80 per cent of the tuberculous patients had far advanced disease, and more than 85

TABLE 4.—*Results of Treatment Related to the Character of Collapse of the Diseased Portion of the Lung*

	Number	Number Improved	Per Cent Improved
Poor collapse	26	6	23
Fair collapse	28	8	29
Good collapse	23	20	87

per cent had tubercle bacilli in the sputum. The high proportion of sputum-positive patients emphasizes the importance of a city hospital for tuberculosis in protecting the community by removing the patients most likely to spread the disease. Pneumothorax treatment was given to 120, or 27 per cent, of the tuberculous patients. Far advanced disease was present among 84 per cent and positive sputum among 88 per cent of those receiving pneumothorax treatment.

Refusal of patients to remain in the hospital constitutes one of the greatest difficulties both in the treatment of the individual case and in the protection of the community. A majority of patients remained in the hospital less than ten weeks, 87 per cent remained less

than seven months and only 6 per cent remained more than one year. Excluding those who died, 65 per cent of the colored and 40 per cent of the white patients left the hospital against advice. In Philadelphia infectious patients who are a menace to others are not compelled to enter the hospital or to remain under care. In some cities, such as New York or Detroit, enforcement of existing legislation enables the authorities forcibly to admit to the hospital and detain infectious patients who do not provide proper care for themselves at home or who conduct themselves in such a manner that they are a menace to those about them. The large number of patients who leave the Philadelphia General Hospital against advice diminishes to a considerable extent the value of the hospital as a means of protecting the community by isolation of infectious patients.

Because of the frequency of short stay in the hospital, information covering a period of more than ten weeks was available for only seventy-seven patients who received artificial pneumothorax treatment. Treatment of sixteen of these was bilateral. Improvement occurred in 47 per cent of cases in which the results of pneumothorax treatment are here analyzed. There was improvement in 25 per cent of the Negroes and in 62 per cent of the white patients.

The results of treatment depend to a large extent on the type of collapse obtained. In this series of patients with advanced disease only one in five of all patients on whom pneumothorax was attempted obtained an anatomically satisfactory collapse; there was no appreciable difference between the colored and white groups in this respect. Satisfactory results were almost limited to the small number of patients who obtained a good collapse. Improvement occurred in 87 per cent of this group, while of the four fifths having a fair space, a poor space, or no space, less than a third were improved. This was likewise true of the patients who received bilateral pneumothorax, all of the eight patients who improved having a satisfactory collapse. Accordingly, in cases in which the advisability of pneumothorax treatment is questionable, collapse may be attempted. In the event of a good space this treatment should be continued. But, in the absence of a good space, continuation of artificial pneumothorax treatment in cases of advanced disease is of doubtful value. When the space is actually poor, especially if pressure readings are unsatisfactory, continued treatment may be not only useless but actually harmful.

Complications of pneumothorax treatment occur more frequently among patients with advanced tuberculosis. In the group under discussion, 65 per cent had either adherent pleura or adhesions that interfered with a satisfactory collapse. The incidence of other complications, including spontaneous pneumothorax and pleurisy with effusion, is likewise high. Following pneumothorax treatment in the hospital, two patients died of spontaneous pneumothorax and two as the result of heart failure. An additional seventeen patients died in the hospital of progressive disease, a fact illustrating that in spite of pneumothorax treatment advanced lesions are frequently uncontrolled. Since they may nullify the value of treatment, the frequency of progressive disease and the likelihood of complications should be taken into consideration in deciding the advisability of attempting collapse therapy.

With increasing reliance on collapse therapy in the treatment of pulmonary tuberculosis, the proper evaluation of bed rest is frequently not appreciated. In cases of less advanced disease and hopeful prognosis there is a tendency to allow more activity, while in cases of progressive disease in which the prognosis is hopeless, strict bed rest is frequently enforced, even though the physician is aware that the disease is incurable and will progress to fatal termination in spite of treatment. It would seem more reasonable to reverse this procedure. The patient with the earlier lesion and better prognosis is precisely the one for whom complete bed rest should be urged, since this may be the factor that determines whether or not the disease will be controlled. On the other hand, provided isolation is maintained, strict bed rest need not be enforced on the patient with advanced disease and hopeless prognosis, if he would be more contented with some activity.

It is not questioned that artificial pneumothorax is a very valuable method of treatment in individual cases and that it may be substituted for institutional care in cases of tuberculosis in which sputum can be rendered negative for tubercle bacilli. Its application should be restricted to suitable cases, however, and it should not be used indiscriminately in an attempt to control far advanced disease. This opinion is wholly in agreement with views recently exposed in an editorial [2] in THE JOURNAL. Commenting on the results of collapse therapy in Chicago, the author made it clear that pneumothorax therapy cannot be regarded as "more than a significant aid in the wider problem of the eradication of tuberculosis" and that tuberculosis control remains "largely a matter of early diagnosis and segregation."

CONCLUSIONS

1. The value of a municipal hospital for the isolation and treatment of indigent patients with advanced pulmonary tuberculosis is limited by the fact that many patients remain in the hospital for short periods only and leave against advice.

2. Lack of or failure to enforce legislation enabling authorities to admit and detain infectious patients diminishes to a large extent the value of the municipal hospital in the protection of the community from tuberculosis.

3. Since the number of patients with advanced disease for whom pneumothorax treatment is successful is relatively small, and since approximately two thirds of these remain sputum positive, pneumothorax treatment, although definitely of benefit to some patients, is not a major function of the hospital as far as the protection of the community is concerned.

4. Pneumothorax should not be attempted for patients with advanced disease when the sole reason for its application is that the prognosis is otherwise hopeless. More harm than good may be accomplished in these cases.

5. The good results of pneumothorax treatment are largely confined to those patients obtaining an anatomically satisfactory collapse.

6. Pneumothorax treatment should be attempted in every case in which this form of therapy seems to offer a chance of improvement, but if a satisfactory pneumothorax space cannot be obtained, prompt discontinuation of this form of therapy is usually advisable.

7. Patients with favorable prognosis should have complete bed rest, even though relatively little disease is present but, provided isolation is maintained, strict bed rest need not be enforced in cases of progressive disease in which the prognosis is hopeless.

Seventh and Lombard streets.

2. Collapse Therapy for Pulmonary Tuberculosis as a Public Health Measure, editorial, J. A. M. A. **113**: 2241 (Dec. 16) 1939.

ALTITUDE AND ARTIFICIAL PNEUMOTHORAX

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Regular established commercial airlines now fly at a constant minimum altitude of 2,000 feet over the passing terrain. To get over the Rocky Mountains they have to rise to at least 15,000 feet. These high altitudes produce definite and prompt physiologic changes which may profoundly affect any patient with artificial pneumothorax.

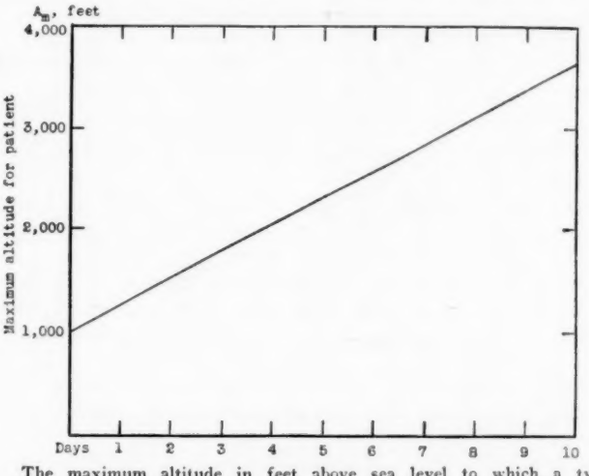
In the normal person the pleural cavity between the chest wall and the outer sac of the lung is only a potential cavity; that is, the two surfaces are everywhere in close contact with each other and no actual space exists. The reason for this is evident, as in this potential cavity the pressure is normally negative, that is, less than one atmosphere, while the pressure within the lungs is always the pressure of the outer atmosphere. As the interior of the lungs communicates freely with the outside air through the trachea, glottis and other structures, the two surfaces are conjointly held tight against the chest wall at all times by this difference in pressure between the inside and the outside.

The condition resulting from the artificial introduction of air into the pleural cavity, the principle of which is well known, is called pneumothorax. Briefly, the artificial introduction of air into this potential cavity reduces the negative pressure in the cavity, eliminating the normal pressure differential between the two walls, and as there is no longer sufficient difference in pressure between the two sides of the lung sac to hold it out against the chest wall, the lung collapses. If sufficient air is introduced into the pleural cavity thus produced, the lung will collapse completely and will in effect become solid. The degree of collapse is determined by the amount of air introduced, which varies with the degree of collapse indicated and the outer atmospheric pressure. When the pressure in the pleural cavity equals that of the outside atmosphere, the lung is completely collapsed. However, obviously this condition is not stable. The air in the pleural cavity is gradually absorbed by the body, and the lung expands as the absorption takes place. The rate of absorption is not constant, and to maintain as complete a collapse as possible at all times, a fresh supply of air must be introduced at frequent intervals.

Another, and possibly more important, factor which may upset the equilibrium of a perfect collapse is the change in atmospheric pressure resulting from decided changes in altitude when traveling. As the pleural cavity is completely closed to the outside, the air introduced into this cavity must be governed by the simple gas laws as far as changes in pressure and volume are concerned. An increase in atmospheric pressure on the outside of the body, due to a reduction in altitude, acting on this air through the flexible medium of the lung, would compress the air within the lung and reduce its volume; since the pressure within the pleural cavity is affected only by the rate of body absorption, it allows the lung to expand while a new condition of equilibrium is reached. Conversely, a decrease in atmospheric pressure due to an increase in altitude would cause the air in the cavity to expand and the lung to collapse, since the pressure within the pleural cavity would then exceed the decreased atmospheric pressure within the lung. Atmospheric pressure could be decreased without difficulty until the lung became completely solid. At this point, however, there could be no further expansion of the air without an accompanying increase in pressure above the atmospheric level because the flexibility of the lung has disappeared and the air is enclosed in a semirigid cavity. As the pressure in the pleural cavity acts directly on the heart and the other organs in the mediastinal space, any increase in pressure above the atmospheric level is apt to be critical. Not only may it cause considerable discomfort but, if allowed to go high enough, it may result in serious difficulty and even death, if the heart and other organs are not able to readjust themselves promptly.

The altitude to which one can go without expecting difficulty depends on how near the lung is to being collapsed when one starts out. If considerable time has elapsed since a fresh supply of air was introduced and the body has absorbed considerable air from the cavity, one can go up several thousand feet without difficulty.

To determine just how high one can go without obtaining a positive pressure at any given time after a fresh supply of air has been introduced into the pleural cavity, the accompanying chart was developed.



The maximum altitude in feet above sea level to which a typical patient may ascend during a ten day period after pneumothorax has been given.

As practically all the factors which affect the maximum safe altitude are different for each individual, a separate chart must be made in each case. In making the chart, the following points must be established:

A. Altitude at which patient has been living and at which last supply of air was added to the pleural cavity.

T. Time interval for replenishing air.

v. Total capacity of pleural cavity in cubic centimeters when lung is completely collapsed.

V. Capacity of pleural cavity in cubic centimeters after absorption has taken place (varies from time to time).

P = Atmospheric pressure in inches of mercury at altitude A. (Standard sea level pressure is 29.92 inches of mercury. Reduce 1 inch for each thousand feet above sea level.)

p. Atmospheric pressure at maximum safe altitude. $p = \frac{PV}{v}$

A_M. Maximum altitude in feet above sea level to which one can go without difficulty (varies from day to day after pneumothorax has been given.)

A_M. (29.92 inches — p) 1,000.

The value v is the total capacity of the pleural cavity when the lung is collapsed.

The value V may be obtained for each consecutive day by substituting the average daily absorption from v for each day after pneumothorax has been given.

As an example of how to make calculations, let us assume that John Jones, who lives at an altitude of 1,000 feet, has a pneumothorax in his left lung. He has 400 cc. of air added to his pleural cavity every ten days. From measurements of his x-ray plate he finds his chest volume to be approximately 4,500 cc. It is assumed that the absorption of the air takes place at a constant rate of 40 cc. a day. In this case the quantities just enumerated would be:

A = 1,000 feet.
T = 10 days.
v = 4,500 cc.
V = 4,460 cc. at end of first day; 4,420 at end of second day, and so on.
P = 28.92 inches of mercury.

The values p and A_M must be calculated as in the following examples:

At end of first day:

$$p = \frac{28.92\ (4,460)}{4,500} = 28.66 \text{ inches.}$$

$$A_M = (29.92 - 28.66)\ 1,000 = 1,260 \text{ feet.}$$

At end of tenth day:

$$p = \frac{28.92\ (4,100)}{4,500} = 26.34 \text{ inches.}$$

$$A_M = (29.92 - 26.34)\ 1,000 = 3,580 \text{ feet.}$$

Calculations for the entire ten day period are shown in the table.

Values at End of Each Day

Days	1	2	3	4	5	6	7	8	9	10
V	4,460	4,420	4,380	4,340	4,300	4,260	4,220	4,180	4,140	4,100
P	28.92	28.92	28.92	28.92	28.92	28.92	28.92	28.92	28.92	28.92
v	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500
p	28.66	28.40	28.14	27.89	27.63	27.37	27.12	26.86	26.60	26.34
A_M	1,260	1,520	1,780	2,030	2,290	2,550	2,800	3,060	3,320	3,580

These values may be graphed as in the chart, with the altitude as ordinate and the time in days as abscissa.

CONCLUSIONS

1. In pneumothorax the air within the pleural cavity is subject to the ordinary physical laws of the expansion of gas.
2. A knowledge of the application of these laws in individual cases may be valuable in determining the size of injection when changes of altitude are contemplated.
3. The method presented here is based on the measurement of the ordinary 6 foot roentgenogram of the chest combined with known data of altitude, present and contemplated, and the size of the pneumothorax injection.

Valmora Sanatorium.

Organic Acids in Foods.—The organic acids citric, malic, tartaric, oxalic and benzoic are widely distributed in common foods. Less common ones like succinic, isocitric, malonic, salicylic and quinic acids also are found in some foods. The present point of view regarding these acids is that they are not mere waste products of metabolism in either plants or animals but that they play fundamental, though as yet undefined, roles in some of the physiologic processes of the body. Some of the organic acids recognized as typical plant constituents are synthesized in the animal body and, in some instances, both the condition of their formation and their precursors are known.—Smith, Arthur H.: Nutrition and Dietetics, chapter I in The Therapeutics of Internal Medicine, New York, D. Appleton-Century Company, Inc., 1940.

ASPIRATION PNEUMONI

AN OBSTETRIC HAZARD

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In October 1937 one of my patients entered the Samuel Merritt Hospital in Oakland in labor at term. She was a healthy normal woman in excellent physical condition, looking forward eagerly and happily to the birth of her first child. She had an ample pelvis, the presentation was normal, and she was assured with confidence that before long her dreams would be realized.

Dilatation progressed normally, and eventually the head was bulging the perineum. The patient was given gas anesthesia for a low forceps extraction. During the course of the anesthesia she gagged and vomited and became very cyanotic. Respiration ceased. Artificial respiration was used for a few seconds and she began to breathe again. Soon her color became normal and it remained so throughout the rest of the delivery and repair. She was returned to her room in good condition, with normal pulse and respiration and no cough.

Thirteen days later she was dead, and the sorrowing husband took the baby they had both wanted so much back to an empty house.

This tragic occurrence caused me to embark on a search for similar cases to see what errors of commission or omission, if any, made such tragedies possible. A careful search of all the medical literature failed to yield a single detailed report of a similar case. The textbooks on anesthesia, as well as numerous articles, mention it as a possibility, but no case reports could be found. Not long afterward, however, I was called in consultation to see a similar case in another local hospital, and inquiry among friends in the East Bay, in San Francisco and in Los Angeles has brought reports of fourteen similar cases. How many more there have been cannot be known. The majority are not fatal and are not reported.

This article constitutes a review of this group of cases, including my own, to see whether any conclusions can be drawn from them. The physicians of these patients gave me permission to use this material.

REPORT OF CASES

CASE 1.—A primipara aged 33 entered the hospital at 1:30 a. m. in the early first stage of labor at term. Rectal examination showed no dilatation. A mixture of scopolamine, morphine and cactine (H. M. C. 1) was given at 3 a. m. so that the patient could secure some sleep. The following forenoon the pains continued to be weak and irregular. At 1:30 p. m. rectal examination showed only 1 cm. of dilatation and it was decided to try to stimulate the contractions with small doses of solution of posterior pituitary, after preliminary sedation. At 2 p. m. she was given sodium allyl (1-methylbutylbarbiturate) 7½ grains (0.5 Gm.) by mouth and scopolamine 1/150 grain (0.0004 Gm.) by hypodermic. At 2:15 p. m. 2 minims (0.12 cc.) of solution of posterior pituitary was given by hypodermic. This gave contractions which remained strong, so that no further solution of posterior pituitary was necessary. Much motor excitement developed and the patient became noisy so that morphine sulfate one-eighth grain (0.008 Gm.) was given at 3:30 p. m. By 6:30 p. m. dilatation was complete, with the head low in the midpelvis. The patient was taken to the delivery room and an attempt was made to get her to push. The head soon came in sight and it was decided to deliver the child with low forceps. Gas anesthesia was started by a trained and skilful nurse anesthetist. About four minutes

Read before the annual meeting of the California Medical Association at Del Monte, May 3, 1939.

after the start of the gas anesthesia the patient gagged and vomited. Respiration ceased and she became very cyanotic. Artificial respiration was resorted to and she soon started breathing again. Her color soon became and remained good. There was no coughing.

The baby was delivered in good condition. The patient was returned to bed at 7:30 p. m. Her pulse rate was 84 and respiratory rate 26. She was still asleep and her breathing was stertorous, but her color was good. A special nurse remained with her.

By 9:30 p. m. she was cyanotic and gasping for air. Atropine 1/150 grain was given and inhalation of oxygen and carbon dioxide was started. Examination of her chest showed coarse bubbling rales throughout. Dr. Hobart Rogers, an internist, was called in consultation. Four hundred cc. of 25 per cent sucrose was given intravenously and another 1/150 grain of atropine. The patient was placed in an oxygen tent, and one ampule of metrazol was ordered given every four hours.

The following morning an x-ray study of the chest was made. The radiologist reported that there was very extensive coarse mottling extending throughout the right lung, most pronounced adjacent to the hilus and gradually diminishing as the periphery of the chest was approached. The shadows were large, soft, indistinct densities following no special distribution; however, there seemed to be more pathologic change in the middle lobe. In the left side there was similar but not quite as extensive mottling, which appeared to be distributed principally in the lower portion of the upper lobe.

The blood count is reported in table 2. The remarkable thing about it was the extremely high percentage of nonfilamented forms. Throughout the day the respiratory rate even in the oxygen tent remained between 40 and 50 and the pulse rate between 110 and 140, though the temperature averaged only about 100 F. (ranging from 102 at 8 a. m. to 98.8 at 11 p. m.). One thousand cc. of 5 per cent dextrose was given during this day and also a transfusion of 680 cc. of citrated blood, it being thought that increasing the number of circulating red cells would aid the blood in its oxygen carrying capacity. The patient coughed but rarely and then raised small amounts of thick rusty sputum, which showed a streptococcus in a smear.

The patient remained continuously in an oxygen tent and was kept alive by this means for thirteen days with but little change in her clinical condition. The oxygen concentration in the tent had to be maintained at between 50 and 60 per cent with from 7 to 10 liters per minute running. Even in this atmosphere her respiratory rate was constantly between 50 and 35 per minute. Her pulse rate remained fairly stationary between 120 and 130. Her temperature oscillated between 99.6 and 101 F. except at the very end.

TABLE 1.—*Pulse and Respiration in Case 1*

Time, P. M.	Pulse Rate	Respiratory Rate
8	92	26
8:30	100	30
9	120	32
9:30	150	34

X-ray examinations of her chest made on four occasions showed a progressive increase in the areas of density. Blood counts were made almost daily. A second transfusion of 500 cc. was given on the eleventh day. Metrazol was given by hypodermic every four hours.

The patient died thirteen days after delivery. A partial autopsy showed both lungs full of a diffuse wet consolidation with air present only at the extreme apexes.

CASE 2.—A primipara was admitted to the hospital in active labor. Fifty minutes after admission she was given pentobarbital sodium 3 grains (0.2 Gm.), and one hour later paraldehyde by rectum. The paraldehyde was not retained and so was given again twenty-seven minutes after the first instillation. Forty-five minutes after the second instillation of paraldehyde the patient, who was having pains, was taken to the delivery room for gas anesthesia. The head came down to the perineum and after forty-seven minutes of gas anesthesia the physician delivered the baby with low forceps. The patient vomited and became cyanotic. Her pulse rate shot up to 156. She was given oxygen inhalations, with nikethamide (coramine) and solution of epinephrine hydrochloride by hypodermic, and soon her color improved. She coughed considerably for several days. After the first few hours her pulse rate settled down to normal. Her respiratory rate was never over 24. She was treated with intermittent inhalations of carbon dioxide and oxygen. A white blood cell count on the fifth day after

TABLE 2.—*Blood Counts, Case 1*

Date, October	Red Cell Count	Hemoglobin, %	White Cell Count	Polymorphonuclears	Nonfilamented Cells
17	4,000,000	80	14,000	97	92
	Transfusion, 680 cc.				
18	.....	..	17,200	96	68
19	.....	..	16,000	93	53
20	.....	..	11,000	95	45
21	4,940,000	94	11,700	92	28
22	.....	..	11,900	85	24
23	.....	..	17,900	94	45
25	.....	..	21,600	90	39
26	4,940,000	88	26,700	90	40
	Transfusion, 500 cc.				
27	.....	..	24,400	91	36
28	.....	..	27,900	91	35
29	.....	..	17,100	96	66

delivery was 21,200 with 88 per cent polymorphonuclears and 12 stab cells. No chest roentgenogram was made. She left the hospital on the tenth day in good condition.

CASE 3.—A primipara aged 30, on whom the physician decided to do a cesarean section because of failure of the head to engage after seven and one-half hours of labor, had no analgesia until this decision was made, when she was given 1½ grains (0.1 Gm.) of pentobarbital sodium by mouth and 1 grain (0.06 Gm.) of codeine by hypodermic. Gas anesthesia was started thirty-seven minutes after the medication. While the physicians were inserting sutures, forty-eight minutes after the anesthetic had been started, the patient vomited a large quantity of undigested food. She became cyanotic and remained so for about four hours. She coughed much and during the next few hours "raised considerable dark material similar to what she had previously vomited." The next day she had a slight cough, with sputum described as rusty. She was treated with frequent inhalations of carbon dioxide and oxygen for seven days. Her convalescence was uneventful. No blood counts or x-ray studies were made.

CASE 4.—A primipara entered the hospital apparently just beginning labor. She was given sodium allyl as shown in table 3. She thus received a total of 10½ grains (0.7 Gm.) over a period of ten hours. With the coming of morning the physician stopped sodium allyl medication. Dilatation was progressing very slowly and he decided to accelerate labor. During the day the patient was given 10 minims (0.6 cc.) of solution of posterior pituitary in six doses. During this time the only analgesia given was 1/6 grain (0.01 Gm.) of morphine at 3:30 p. m. By 7 p. m. dilatation was reported complete. At 9 p. m. the physician decided to deliver the baby with low forceps. Open drop ether was used to put the patient to sleep. Forceps were being placed on the head when the patient vomited a large amount of what was described as "coffee ground" vomitus. She inhaled some of it and ceased breathing. She was given nikethamide twice. When respirations began oxygen was given, but the patient's condition was so poor that the physician thought it best to discontinue attempts at delivery for a time. The patient was left lying on the delivery table with her head lowered; the anesthetist continued to give oxygen and carbon dioxide for two or three hours. The shocklike condition apparently caused absolute loss of tonicity in the uterine muscle. This, combined with the fact that the patient was lying with her head much lowered, caused the baby's head to fall back entirely out of the pelvis. I saw this patient in consultation about four hours after the incident. She was still dusky; her respiration was rapid and her pulse rate 140. The presenting part was far above the pelvic brim. It was thought

best to ignore the pregnancy and treat the shock for the time being. The patient was put back to bed. After some hours, uterine tone returned; the head reentered the pelvis and came down to the perineum with right occipitotransverse presentation. There it remained with the sagittal suture transverse for two hours, and it was decided that forceps must be used to rotate it and deliver the baby. The patient was given a spinal anesthetic and delivery was easily effected.

A roentgenogram of the chest taken fourteen hours after aspiration showed an area of haziness and increased density in the lower lobe of the left lung.

A white blood count taken twelve hours after the aspiration showed 22,400 cells, with 95 per cent polymorphonuclears and 45 stab cells.

During the next few days there developed symptoms suggestive of a moderately severe bronchopneumonia. The patient's maximum temperature three days after delivery was 102.6 F. By the eighth day following delivery her temperature was normal and she went home in good condition.

TABLE 3.—*Administration of Sodium Allyl in Case 4*

Dose, Grains	Time
3	9:40 p. m.
1½	11 p. m.
1½	Midnight
3	2 a. m.
1½	7 a. m.

CASE 5.—A woman entered the hospital with pains occurring every five minutes. Five hours after admission, when her cervix was reported as dilated 4 fingerbreadths, she was given pentobarbital sodium 3 grains and one hour later scopolamine 1/150 grain. She was taken to the delivery room with the head showing at 1:30 a. m., five and a half hours after administration of pentobarbital sodium and four and a half hours after scopolamine. Vaginal examination showed the head to be in direct posterior position, and the physician decided to deliver it in this position with forceps. The patient was anesthetized with gas. During the delivery she began to vomit "black coffee ground material" and it was felt at the time that she had probaly aspirated some of the vomitus. Her pulse rate rose to 156 and respiratory rate to 40. She was given carbon dioxide-oxygen mixture and nikethamide by hypodermic. Gradually her condition improved, although six hours later her pulse rate was still 130 and respiratory rate 24. A persistent cough developed. She was given carbon dioxide-oxygen mixture for five minutes every two hours for forty-eight hours, after which time treatment consisted of diathermy applied to her chest and administration of elixir of terpin hydrate. She did not at any time have clinical symptoms of pneumonia. No roentgenogram was taken and no white count was done.

CASE 6.—A woman was admitted to the hospital with mild pains and a 4 cm. dilatation. About one hour after admission she was given pentobarbital sodium 3 grains, and twenty minutes later scopolamine 1/100 grain (0.6 mg.). The same dose of scopolamine was repeated in another twenty minutes and again two hours later. The patient was delivered with low forceps under gas anesthesia eighteen minutes after her third hypodermic of scopolamine. While the physician was repairing an episiotomy the patient vomited and became cyanotic. Her head was lowered and she was given carbon dioxide-oxygen mixture and oxygen (90:10); this was continued for one and a half minutes every twenty minutes for the next thirty-six hours. She coughed up considerable vomitus. X-ray study of her chest on the day following delivery showed no involvement of her lungs. The white count the day following delivery showed 17,100 cells, 82 polymorphonuclears and 30 stab cells. Four days later it was 13,500 cells, with 80 polymorphonuclears and 13 stab cells.

CASE 7.—A primipara aged 26 began having pains at 1 a. m.; labor progressed rapidly. She was given scopolamine 1/200 grain (0.3 mg.) at 3:25 a. m. and pantopon 1/3 grain (0.02 Gm.) at 3:50 p. m. Labor progressed steadily with severe pains which did not respond well to the analgesia. After complete dilatation, the head being on the perineum, the patient was given gas-ether anesthesia and the baby was delivered by outlet forceps. As she was coming out of the anesthesia after delivery of the baby's head the patient vomited and aspirated some of the vomitus. Respiration ceased, the heart continuing to beat slowly but strongly. Artificial respiration was used. One cc. of nikethamide was administered intravenously and 1 cc. of solution of epinephrine hydrochloride was injected into the cardiac muscle. Gradually the heart became weaker and death ensued.

Autopsy showed both lungs collapsed and the bronchi of each lung filled with dark colored contents, apparently spinach or some other dark food.

CASE 8.—A woman entered the hospital at 2:20 p. m. saying that she had been having pains for ten hours. The contractions were very weak and it was questioned whether she was in true labor. About 7 p. m., however, pains became strong and definite. At 8 o'clock she was given scopolamine 1/200 grain. At 9 o'clock this medication was repeated with addition of pentobarbital sodium 3 grains (0.18 Gm.). Ether was also given rectally at this time but was not retained. At 9:30 the patient was taken to the delivery room and administration of gas and oxygen was started, the anesthesia being given by a physician specializing in anesthetics. The membranes were ruptured artificially and the baby was delivered with low forceps at 10:07 p. m. The patient vomited during delivery. After the repair, her stomach was washed out until clear. Carbon dioxide-oxygen mixture was given for ten minutes every hour until the following morning. On the following day the patient stated that she felt fine. The temperature was normal. However, the respiratory rate was 32; she had an occasional thick cough, and there were scattered rales over the lower lobes of both lungs posteriorly, especially on the left. Two days later the cough was somewhat worse, with pink tinged expectoration. The temperature was only 99.2 F. but examination of the chest revealed increased voice sounds with coarse and fine rales at the base of the left lung. The patient was discharged fourteen days after delivery with normal temperature and respiration. She still had some cough. She was hoarse for at least six weeks and could not smoke comfortably for some months, although previously she had used about one pack of cigarets a day.

CASE 9.—A woman entered the hospital after having had pains for twelve hours at home. The cervix was dilated from 5 to 6 cm. on admission; pains occurred every five minutes, lasting from thirty-five to forty seconds. The baby was in breech presentation. After routine preparation she was given pentobarbital sodium 4½ grains (0.3 Gm.). The baby was delivered about three and one-half hours later. During delivery the mother vomited a quantity of yellow liquid and probably aspirated some of it. She began to cough immediately and for the next few days her cough was very distressing. Two hours after delivery it was noted that she was raising "pink frothy material"; on the following morning considerable bloody mucus was being expectorated. The respiratory rate eight hours after delivery was 30 and the pulse rate 140. Twenty-four hours after delivery the pulse rate was still 140 and the respiratory rate 32. Her face and hands were very cyanotic, and nasal administration of oxygen was started. This was kept up continuously for the next three days, after which it was discontinued, although the respiratory rate was still 32 and the pulse rate 110. This patient remained in the hospital for eighteen days. Her temperature during most of this time was about 100 F. It never went over 101 and was still going to 99.6 on the eighteenth day post partum. The pulse rate never fell below 100 until the eleventh day post partum. She was seen in con-

TABLE 4.—*Blood Count in Case 9*

Days Post Partum	White Cell Count	Polymorphonuclears	Nonsegmented Cells
2	34,900	95	19
5	23,700	87	46
9	13,400	65	9

sultation by an internist, Dr. Philip Pierson, who found scattered crepitant rattling and wheezing rales over the lower and middle lobes of the left lung. Roentgenograms of the chest made on the eighth and the fourteenth day post partum were reported as showing evidence of diffuse bronchopneumonia.

Sputum examination six days post partum showed a moderate number of pus cells within a few gram-positive diplococci. On culture, the sputum revealed Streptococcus viridans and a nonhemolytic streptococcus.

CASE 10.—A primipara aged 21 was delivered by outlet forceps after twenty-seven hours of labor. There is no record of the analgesia that was used in this case. The anesthetic for delivery was gas-ether, given by a nurse anesthetist. The patient vomited just prior to delivery and the physician states that there was a large amount of undigested food. This patient's chart showed no marked effect on her temperature, pulse or respiration until about twenty-four hours after delivery. At about that time the temperature began to rise steadily, reaching a peak of 103.4 F. on the fourth day post partum (the highest temperature recorded in this series); thereafter it gradually fell to normal. Her pulse rate rose to 120 about twenty-four hours after delivery and remained between that point and 150 during the next three days. Her respiratory rate was not noted as elevated until about forty-eight hours after delivery, but it reached 46 on the fourth day post partum, at the time of her greatest fever. She complained of shortness of breath and irritation in the trachea on forced inspiration. X-ray study of her chest on the fourth day post partum showed some density in the lower lobe of the left lung behind the heart shadow, very suggestive of a small amount of pneumonitis. This patient left the hospital on the eleventh day, still having a low grade afternoon fever, which the physician attributed to her chest condition.

CASE 11.—A primipara aged 32 had labor pains at 5 p. m. just after eating a large bowl of vegetable soup. The pains were severe and close together. The progress of labor was rapid. By 9:20 p. m. the cervix was fully dilated. When the head came down to the perineum a low forceps delivery was done. The patient took the anesthetic poorly and vomited a large amount of acid fluid, probably the soup. Although the anesthetic was given by the chief anesthetist of the hospital, aspiration was considerable. There was moderate laceration of the perineum, which was repaired immediately. One hour post partum the patient was not in great distress but could not sleep because of headache and cough.

At 8 o'clock the following morning the patient was cyanotic and coughing. Beginning pneumonia was diagnosed by a well recognized internist. By 5:30 p. m. cyanosis was extreme. The respiratory rate was from 50 to 55 per minute and the pulse rate from 128 to 148. Examination showed that the lungs were full of fluid. Considerable frothy blood stained fluid was constantly being expectorated. Atropine $\frac{1}{100}$ grain was given and the dose was repeated without apparent effect. A venesection of 400 cc. was done without improving the patient's condition, which grew rapidly worse. She died at 8:35 p. m., about twenty-two and one-half hours after the aspiration.

CASE 12.—A woman decided during dinner that she would like to have her baby that evening. After dinner she went to the hospital, where the baby was delivered by classic cesarean section. She was at term but not in labor. Gas-oxygen anesthesia was used. The patient started vomiting shortly after the baby was delivered. Respirations ceased; although her heart continued to beat for some time, breathing could not be started. There was no autopsy.

CASE 13.—A patient was delivered by cesarean section after a twenty hour test of labor. During this twenty hours she received 15 grains (1 Gm.) of pentobarbital sodium (6 grains [0.4 Gm.], 3 grains, [0.2 Gm.], 3 grains, 3 grains) and $\frac{1}{200}$ grain (1.2 mg.) of scopolamine ($\frac{1}{200}$ grain with each dose of pentobarbital sodium). There was a face presentation. When the decision to do a cesarean section was made an additional $\frac{1}{150}$ grain of scopolamine was given. The anesthesia used for surgical intervention was cyclopropane; the anesthetist was a trained and skilful physician. The vomiting occurred just after skin closure. The patient's head was slightly lower than the rest of her body at this time. The only immediate treatment consisted of turning the head to one side and wiping the face. There was no immediate reaction. The temperature at the time of operation was 37.5 C. (99.5 F.) and five hours later rose to 38.5 C. (101.3 F.). After pursuing an irregular course, it reached 40.4 C. (104.7 F.) on the fourth postoperative day. From this point the trend was irregularly downward, the value reaching normal, to remain there, on the thirteenth postoperative day. The pulse rate rose from 90 at the time of operation to 132 five hours later, reached its high point of 140 in fifteen hours and thereafter ranged irregularly downward, becoming normal on the nineteenth day. The respiratory rate was 18 before operation, rose in eight hours to 24, ranged between 20 and 24 during the next twenty-four hours and reached 32 during the succeeding twenty-four hours. At the end of the third postoperative day it reached 48. It varied between 32 and 48 during the next forty-eight hours, after which it varied between 20 and 28. The rate came down to an essentially normal level on the eighth postoperative day.

X-ray study on the fifth postoperative day showed some consolidation in the lower lobes of both lungs, more on the right side. On the eleventh postoperative day x-ray examination still showed some consolidation, though less, with a high diaphragm; on the eighteenth postoperative day both lungs looked clear.

Blood culture on the fourth postoperative day yielded no growth.

Sputum examination on the fourth day after operation revealed large numbers of Staphylococcus aureus and moderate numbers of Streptococcus viridans with a few nonhemolytic streptococci. A white mouse which was inoculated was normal after seventy-two hours. The Neufeld test was negative.

CASE 14.—A primipara aged 22 was in perfect physical condition. Labor started spontaneously. The first stage lasted twelve hours. There is no note on the record as to what analgesia was used. With the head on the perineum the patient was taken to the delivery room for prophylactic forceps. She had had no solid food for twenty-two hours. Gas and oxygen anesthesia was given by an intern with limited anesthetic training. About two minutes after the induction of anesthesia the patient began to vomit and became cyanotic. Anesthesia was stopped and the patient turned on her side to aid removal of vomitus. Cyanosis increased and respiration ceased. Suction was used to remove particles of undigested food, which must have been eaten at least twenty-two hours previously. All efforts at artificial respiration, including a pulmotor, failed, and heart action ceased. No forceps were applied until the mother's pulse ceased. Efforts to resuscitate the baby, delivered post mortem, failed. There was no autopsy.

CASE 15.—This case represents the only aspiration in the series not occurring at the time of delivery. A woman aged 35 entered the hospital one afternoon for an operation to remove what turned out to be a dermoid cyst of the ovary. She was operated on the following morning after careful preoperative preparation. The anesthetic was being given by a trained nurse anesthetist. The abdomen was opened through a midline incision. While packs were being placed in the abdominal cavity the patient vomited what looked like orange juice. Directly thereafter pinkish foam began to issue from her nose and mouth, the color soon changing to dark brown.

The anesthetic was stopped and her mouth was cleared. When she seemed in good condition the anesthetic was resumed and the operation proceeded. About forty-five minutes later, when the surgeon was about ready to close the wound, the patient became cyanotic; her pulse was rapid and irregular, and her blood pressure dropped to 60 systolic. A stomach tube was then passed, and more orange juice and gastric secretion were obtained. Atropine $\frac{1}{75}$ grain (0.0008 Gm.), and 1 cc. of a solution of epinephrine hydrochloride were given by hypodermic, and 60 cc. of 50 per cent dextrose was given intravenously. While the surgeon was closing the wound the patient ceased breathing several times. She was given carbon dioxide and oxygen and eventually was returned to bed in fair condition. Inhalations of carbon dioxide and oxygen were kept up for five minutes every four hours for the next thirty-six hours. There developed a troublesome cough, which was treated with codeine and steam inhalations. The pulse varied between 100

and 120 for the next five days. Five days after operation there was dulness over the entire base of the right lung. The white blood cell count was 8,750 with 71 per cent polymorphonuclears The patient was raising much sputum containing many elastic fibers, a few gram-positive cocci and occasional red blood cells. On the seventh day she was still coughing with violent paroxysms and raising thick purulent material. Her respiratory rate was 20 and her pulse rate 100; her white cell count was 12,600 with 72 per cent polymorphonuclears. A roentgenogram taken this day showed the picture of bronchopneumonia on the right; the left lung was clear. She left the hospital in good condition on the eighteenth day.

TABLE 5.—*Analgesia and Vomiting*

Case	Analgesia	Elapsed Time Before Vomiting
1	Mixture of scopolamine, morphine and cactine (H. M. C. 1)	15½ hr.
	Sodium allyl, 7½ grains Scopolamine, 1/150 grain	5 hr.
	Morphine sulfate, ⅛ grain	3 hr.
2	Pentobarbital sodium, 3 grains	3 hr.
	Paraldehyde, 4 ounces (rectal)	1½ hr.
3	Pentobarbital sodium, 1½ grains Codeine, 1 grain	85 min.
4	Sodium allyl, 10½ grains in divided doses over 10 hr. period (time between last dose and vomiting)	14 hr.
	Morphine sulfate, ⅙ grain	5½ hr.
5	Pentobarbital sodium, 3 grains	5½ hr.
	Scopolamine, 1/150 grain	4½ hr.
6	Pentobarbital sodium, 3 grains	3 hr.
	Scopolamine, 1/100 grain	2¾ hr.
	Scopolamine, 1/100 grain	2 hr.
	Scopolamine, 1/100 grain	18 min.
7	Scopolamine, 1/200 grain	2½ hr.
	Pantopon, ⅓ grain	2 hr.
8	Scopolamine, 1/200 grain	2 hr.
	Scopolamine, 1/200 grain Pentobarbital sodium, 3 grains	1 hr.
9	Pentobarbital sodium, 4½ grains	1 hr.
10	No record	
11	No record	
12	No record	
13	Pentobarbital sodium, 15 grains in 4 doses Scopolamine, 4 doses of 1/200 grain	During 20 hr. test of labor
	Scopolamine, 1/150 grain	Shortly before operation
14	No record	
15	No record	

COMMENT

From a study of this series of cases several things become apparent:

1. Aspiration pneumonitis is not a rare condition. These cases were collected merely by making inquiry among a circle of medical acquaintances, twelve of them occurring within the last two years. As to how many other cases there may have been one can only speculate.

2. The condition is serious. In these fifteen cases there were five deaths, while several of the other patients required prolonged hospitalization.

3. There are two types of cases: those in which the material aspirated is of a solid nature and those in which it is fluid. In the first group, death may result rapidly from mechanical obstruction of the air passages or it may be due to the same type of shock which causes sudden death in cases of arterial embolism, even when the fraction of the total lung tissue involved is relatively small. When the aspirated material is of a fluid nature it seems to set up a chemical pneumonitis. The x-ray picture may be that of bronchopneumonia, but there are clinical criteria which are different; viz., the temperature reaction is not so high; cyanosis is more marked; the pulse and respiration are apt to be more rapid; the sputum is more pronounced, and the bacteria are apt to be secondary invaders. Possibly the chemical reaction creates an environment unfavorable to bacterial growth. Possibly the character of the fluid aspirated is of little importance; I feel that the reaction in lung tissue is set up by certain fractions of the gastric juice itself and that whether this juice is mixed with soup or orange juice, milk or water may make little difference. Clinically the picture is different from that of bronchopneumonia.

4. Fourteen of the fifteen women were in the act of parturition. Three of these were being delivered by cesarean section; one had a breech extraction, all the rest being delivered by low forceps. Is aspiration pneumonitis primarily an obstetric complication and if so, why? Is there some factor of pressure on the pelvic floor which makes women especially prone to vomit and inhale deeply, or does this complication occur just as frequently in the practice of general surgery? It has been suggested that the surgical patient is apt to be more carefully prepared for anesthesia than a woman in labor. During the World War I gave many anesthetics in an evacuation hospital in France where preoperative preparation was nil. I never saw or heard of a case of aspiration pneumonitis, but I have made no study of the statistics in the Surgeon General's Office.

5. Does the type or amount of premedication, the analgesia used during labor, have any effect on this condition? Table 5 has been prepared to study this factor.

A specialist in nose and throat work who makes frequent use of the bronchoscope and esophagoscope has informed me that he does not believe it would be possible to give enough barbiturate to abolish the gag reflex.

6. Is the blame for aspiration pneumonitis to be placed on the anesthetist? I do not believe it is, although, if the anesthetist is keenly alert, the amount aspirated may be reduced to a minimum.

The anesthetist and type of anesthesia in the cases here reported are indicated in table 6.

Whether anything can be done to prevent this unfortunate complication I am not prepared to say. Probably women in labor should not be given much to eat. If there were no solid material in the stomach, the chance of aspiration of chunks of food which might mechanically obstruct the air passages would be reduced. But the stomach at this time is often slow in emptying itself, and the material regurgitated may have been eaten hours before the onset of labor. Furthermore, several of these patients vomited only fluid; and if the hypothesis is correct that the chemical reaction in lung tissue is set up by some factor in the digestive juices themselves, the presence or absence of food diluting those juices might make little difference.

Certainly every delivery room ought to be equipped with an efficient suction apparatus kept constantly ready

TABLE 6.—*Type of Anesthesia*

Anesthetist	Number of Cases
Physician specialist in anesthesia	2
Intern	2
Trained nurse anesthetist	6
Delivery room nurse not especially trained in anesthesia	3
Unknown	2

Anesthetic	Number of Cases
Gas-oxygen	8
Gas-ether	2
Ether only	1
Cyclopropane	1
Unreported	3

for instant use. Possibly anesthetists should not be permitted to fasten the gas mask on the patient's head, as one sometimes sees them do, since its removal may cause the loss of precious seconds if it becomes filled with vomitus. Possibly all delivery tables should be so constructed that the patient's head could be promptly lowered should vomiting occur, to facilitate escape of the vomited material; and yet in one case (case 13) the head was lowered at the time aspiration occurred.

SUMMARY

Of a series of fifteen cases of aspiration pneumonitis, five resulted in death; fourteen of them concerned women who were being delivered of a baby. A study of these cases fails to disclose any factor which was present in enough instances to make it seem a predisposing cause. Some measures may help prevent it. The treatment at present is purely symptomatic.

In reporting this series of cases I hope to arouse the interest of others who may help solve the question as to how frequently this unfortunate accident occurs in general surgery or whether it is chiefly an obstetric hazard.

411 Thirtieth Street.

THE INCIDENCE AND MECHANISM OF BILATERAL PLEURAL EFFUSIONS

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The simultaneous occurrence of bilateral pleural effusions is rare except in cardiorenal disease and as a direct complication of bilateral artificial pneumothorax used in the treatment of pulmonary tuberculosis. In comparison there is a relatively high incidence of unilateral tuberculous effusions occurring spontaneously or in connection with artificial pneumothorax, as shown in a study of 700 cases studied at the Department for Diseases of the Chest of the Jefferson Hospital and of an additional series from one service of the White Haven Sanatorium. According to the past histories there had been 108 pleural effusions and following entry 151.

Concerning the group of effusions observed during hospitalization, ninety-two were definite complications of artificial pneumothorax, of which fourteen cases were bilateral, the fluid having developed somewhat in relation to the progression of the pneumothoraces; in three cases of bilateral pneumothorax the fluid was limited entirely to one pleural cavity. Five patients with effusions of one pleural cavity following pneumothorax had subsequent development of fluid on the opposite side but only after the primary collection had disappeared. Similar conditions were noted by Charr [1] in a series of 100 tuberculous patients treated with unilateral artificial pneumothorax; there was no instance of fluid occurring simultaneously in the opposite pleural cavity. A case studied by Theodos [2] at the Sea View Hospital should be mentioned: For several months a pleural effusion had been present on one side and finally as spontaneous absorption occurred an effusion appeared in the opposite pleural cavity and subsequently ascites; x-ray study of the spine showed early Pott's disease; the sputum was negative for tubercle bacilli. It was the impression in this case that the second pleural effusion was due to hematogenous tuberculosis. These figures illustrate the relative high incidence of pleural effusions in pulmonary tuberculosis, especially as complications of the artificial pneumothorax; likewise they indicate that effusions rarely occur simultaneously in the opposite or untreated pleural cavity. The data serve as a basis for considering the mechanism of bilateral collections in certain cases of unilateral pulmonary collapse in which reexpansion of the lung has been attempted, the subject of the present paper.

During the past two years four patients have been discovered with moderately advanced pulmonary tuberculosis manifesting unusual developments of pleural fluid. Three patients had been receiving artificial pneumothorax treatments on the right side; the fourth was treated on the left side. Collapse of the lung was inadequate, and it was decided to allow reexpansion so that thoracoplasty or some other form of compression therapy could be tried. After several weeks of conservative treatment without any noticeable change in the contour of the lung, forceful intrapleural suction was tried. With each attempt there was severe pain in the chest with weakness and marked dyspnea, and subsequently fluid developed in the opposite pleural cavity. In the fourth case, with marked retraction of the lung on the pneumothorax side due to apical adhesions and fibrosis, suction was employed less strenuously but severe reactions also occurred. Within about twenty-four hours x-ray examination showed a spontaneous pneumothorax and pulmonary emphysema and subsequently the gradual development of pleural fluid. The fifth patient was a woman 32 years of age who had received unilateral artificial pneumothorax treatments empirically on the left side for the persistent formation of pleural fluid of unknown etiology.[3] After about two years of unsuccessful control pneumothorax was discontinued. The lung failed to reexpand and there was no essential retardation of the fluid; then reexpansion of the lung was attempted by means of pleural suction. With each induction of negative intrapleural pressures (—15 to —22) there was severe pain in the chest with extreme dyspnea, displacement of the heart and herniation of the mediastinum toward the affected side; after the third attempt a transudate, which later became an exudate, suddenly developed on the opposite side. Dyspnea continued until the pleural pressures were reduced and equalized on the two sides. Subsequently the condition was proved to be cancer of the pleura, metastasis having originated from a new-growth of the ovary.

The remarkably low incidence of bilateral pleural collections of fluid occurring simultaneously except in bilateral pneumothorax has suggested the possibility that some mechanical factor is responsible, perhaps at first in disturbing the adhesive tension of the pleura and later in causing a rupture of a pleural tubercle leading in turn to spontaneous pneumothorax with its irritating and infecting influences on the pleura. The groundwork for such pleural complications is shown grossly in thoracoscopic studies of pneumothorax cases by Alexander,[4] Willauer [5] and others. They have

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1. Charr, Robert: Personal communication to the author, 1939.
2. Theodos, Peter: Personal communication to the author, 1939.
3. Packard, J. S., and Gordon, Burgess: Bilateral Pleural Collections of Fluid, Am. J. Roentgenol. **40**: 859 (Dec.) 1938.
4. Alexander, John: The Collapse Therapy of Pulmonary Tuberculosis, Springfield, Ill., Charles C. Thomas, Publisher, 1937.
5. Willauer, George: Personal communication to the author, 1939.

repeatedly found tubercles of the pleura in all stages of progression and reaction. In not a few instances the formations are greatly increased at the base of adhesions, illustrating the traumatizing influences of cough and of forceful respirations. Thus it would seem that in almost every tuberculous lung with subpleural tubercles there are potentialities for greatly increased pulmonary disease and accordingly the complications of spontaneous pneumothorax and pleural fluid. Likewise any complication of the pleural cavity will be more or less continuously aggravated by reason of the fact that lymphatic drainage from the pleural portion of the lung is directed toward the pleura.

Evidently the exudative pleuritides are more common with than without pneumothorax, and inflammation may develop and extend rapidly in loose tissue and on the free pleural surfaces. Conversely, while the pleurae continue in normal apposition any tuberculous lesion will tend to develop in the form of local granuloma or as a small exudate which is quickly localized. Furthermore, with the pleurae in contact the absorption of exudates will be encouraged by the normal respiratory movements. This pathologic and physiologic relationship is illustrated in Charr's [1] cases in which autopsy was performed, openings being found in the anterior surfaces of the lungs, in the center of large and acutely caseous tubercles, measuring approximately 1.5 cm. in diameter. The visceral pleura covering the caseous nodules, either ruptured or intact, was thin and transparent; when the air was pumped into the main bronchi the intact visceral pleura covering these caseous nodules ballooned out remarkably. While the caseous nodules were numerous on the anterior surface of the lungs, the posterior parts showed marked congestion with areas of pneumonia but without any definite adhesion of the adjacent parietal pleura, thus indicating a fulminating form of tuberculosis. In seven other cases the perforations occurred in the axillary region of the lungs, about midway between the apex and the lower border of the upper lobe, and there was no indication of any perforation through caseous tubercles. Furthermore, there was much pleural thickening about the ruptured areas; the pulmonary tuberculosis was chronic and proliferative. These cases illustrate the possibilities and dangers of pleural complications, e. g. pneumothorax and fluid. It is quite conceivable that the rupture of tubercles and tearing of adhesions are immediately responsible for the intrapleural developments.

According to the present consideration the normal apposition of the pleural surfaces with restricted thoracic movements and undisturbed pulmonary and mediastinal structures is a factor in the prevention of spontaneous pneumothorax and pleural fluid. There is a good deal of discussion as to whether or not a negative intrapleural pressure exists with the pleural surfaces in normal apposition, i. e. without the induction of artificial pneumothorax. Brauer [6] insists that negative intrapleural pressure is essentially a manifestation of pneumothorax and that the physical force of cohesion between the pleural leaves is sufficient to balance the elastic retraction of the lung. In any event the lung almost fills the thoracic cage, which promotes a mechanical contact of the pleura. The important point as far as pneumothorax is concerned in its relation to the development of pleural fluid is not so much the absence of negative intrapleural pressure as the loss of pleural apposition throughout. Concerning the effects of fluid in one pleural cavity on the development of fluid in the opposite pleural cavity there appears to be no influence except as to prevention. Evidently the pleural surfaces of the expanded lung on the side opposite the effusion will be opposed with even greater security than normally by reason of the compressive action of the displaced mediastinum and lung. Conversely, the forceful traction or expansion of the collapsed lung as induced by a high negative intrapleural pressure will shift the mediastinum and stretch the opposite lung, thus separating its hitherto opposed pleural surfaces. The events are these: Air and fluid will pass spontaneously or be sucked into the pleural cavity.

There is the possibility that some mechanism other than separation of the pleura with spontaneous pneumothorax may be responsible for the development of pleural fluid. Heart failure, hypostatic congestion and pressure on the azygos veins should be considered. In the present study there was no evidence of disturbed circulation, and the manifestations were relieved promptly with the adjustment of the intrapleural pressure. While displacement may have caused pressure effects on the azygos veins, the shifting was much less marked than is seen in a considerable number of cases of pneumothorax and pleural effusion in which the opposite pleural cavity is not disturbed. On the other hand the transudate which preceded the exudate in the carcinomatous case suggests that blood was sucked first from the fine capillaries into the newly created pleural space. Likewise the occurrence of pulmonary rales and a friction rub in association with pain, dyspnea and the x-ray evidence of mediastinal herniation just prior to the development of fluid emphasize the possibility that "suction" was an important factor.

The immediate symptoms noted during attempts to reexpand the contracted lung may be related to separation or pulling of the pleurae, wrenching or distortion of the mediastinal structures and the interference with pulmonary ventilation, the former two causing thoracic pain, the latter favoring dyspnea. Shortness of breath may be attributed to two factors: Decrease of the vital capacity due to the bilateral pulmonary compression and, perhaps more directly, the gradual bilateral rise of intrapleural pressures, the latter becoming less and less negative—that is, tending to become positive, owing to the proportionate increase of fluid. Since cohesion of the pleural surfaces is lost with the onset of fluid there is no suction to counterbalance the normal elastic retraction of the lungs and thus the respiratory movements proceed in a restricted manner. Instead of the pressure becoming more and more negative as the thorax expands normally, which would cause an inspiratory rush of air, the pleural pressure increases to a point at which it becomes so positive that the inspiratory passage of air is impossible. This was proved repeatedly with the carcinomatous patient, from whom various amounts of fluid were removed, after which the intrapleural pressure was changed alternately by withdrawing or introducing air, the purpose being to cause the variation to range between subatmospheric and atmospheric levels.

CONCLUSIONS

1. A series of 259 cases of pleural effusion was studied to determine the frequency of spontaneous, simultaneous bilateral collections of fluid; there was no instance of this particular development.

6. Brauer, Ludolph, and Spengler, Lucius: Die operative Behandlung der Tuberkulose, in Handbuch der Lungentuberkulose, ed. 2, Leipzig, Johann Ambrosius Barth, 1919, vol. 3, p. 170.

2. Simultaneous bilateral effusions were noted in four cases of pulmonary tuberculosis and in one case of pleural new growth in which intrapleural suction had been substituted for unilateral artificial pneumothorax on the originally treated side.

3. The present study suggests that the occurrence of fluid in the opposite, or untreated, pleural cavity in cases of artificial pneumothorax is closely related to intrapleural suction used to reexpand the contracted lung.

4. The mechanical displacement of the mediastinum and stretching of the opposite lung causes a separation of the pleura, rupture of pleural lesions and the subsequent development of fluid.

5. The study emphasizes the need for great caution in dealing with the long-contracted lung.

6. The lung should be allowed to expand slowly under the control of reduced artificial pneumothorax, and with its failure to expand a thoracoplastic operation should be performed in order to bring the pleural surfaces into apposition.

1832 Spruce Street.

CLINICAL STUDIES OF PRIMARY CARCINOMA OF THE LUNG

AN ANALYSIS OF SEVENTY-FIVE CASES, TWENTY-ONE OF WHICH WERE TREATED BY PNEUMONECTOMY OR LOBECTOMY

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Before a disease entity can be satisfactorily brought under control, the medical profession as a whole must become interested in the disease. In order to arouse interest in the condition, it must be shown that the occurrence is frequent enough to be of practical importance and that something can be offered in the way of efficient therapy. It is our purpose in this paper to show that primary carcinoma of the lung is a disease that deserves this interest. Consideration will be given to its incidence, its early clinical manifestations, the available methods of diagnosis and treatment, and the results of a clinical analysis of seventy-five cases, in twenty-one of which treatment was either by lobectomy or by pneumonectomy.

INCIDENCE

The lung can now be shown to be a common, rather than a rare, site for the development of a primary malignant growth. Autopsy material from general hospitals, where admissions are unselected, is the most reliable source of data on the relative frequency of fatal diseases. A study of 52,305 recently collected autopsy reports (table 1) reveals that approximately 10 per cent of all primary cancers originate in the lungs. The incidence in the various groups ranged between 6.3 and 18.5 per cent. It is startling to learn that in the group of 7,685 consecutive autopsies done in the Cleveland City Hospital and reported by Koletsky,[1] the lung was the second most frequent site of origin of primary malignancy, being exceeded only by the stomach. Also in the series of 6,800 autopsies reported from the Cook County Hospital, Chicago, by Jaffé,[2] the lung was in third place, the stomach being first, and the intestine second.

Graham [3] has tabulated autopsy reports from various European and American hospitals which have appeared during the past twenty-five years. In all but one report the increase in the frequency of cancer of the lung was striking. In a total of 62,802 necropsies the percentages of primary lung cancers to all cancers were reported (table 2). Simons [4] has clearly shown that the high incidence of lung cancer today is due both to a relative and to an absolute increase in frequency.

The numerical importance of the problem becomes apparent when it is appreciated that approximately 15,000 people in the United States die each year from cancer originating within the lung. This estimate is based on the statistical study by Dublin,[5] who finds that approximately 150,000 persons die from cancer of all types each year. Since 10 per cent of all cancer deaths are due to primary carcinoma of the lung, it is fair to estimate the toll from this disease at 15,000 a year.

FAILURE OF IRRADIATION

The only weapons available today in the fight against cancer are radium, x-rays, fulguration and surgical excision. All forms of irradiation have up to the present time failed completely as curative agents. Graham and his associates [3] have been unable to find record of a single verified case of a five year cure by this method of treatment. Furthermore, they conclude that high voltage roentgen therapy does not prolong the lives of patients with carcinoma of the lung, because the great majority of the tumors are radioresistent. Our own experience with irradiation has also been disappointing. We have not obtained a single cure by means of this treatment. Also a study of life expectancy of inoperable patients revealed that, on the average, the patients who received high voltage roentgen therapy lived only two thirds as long as untreated patients. The average duration of life in the two groups is shown in table 3.

The failure of irradiation is not surprising, since the majority of lung cancers are situated in the stem bronchi, which places them anatomically as near the center of the body as it is possible for them to be. Thus deliverance of a dosage sufficient to destroy the tumor without irreparable damage to the surrounding tissues is practically impossible. Also pulmonary infection frequently follows bronchial occlusion by the primary growth. In such instances irradiation will often aggravate the inflammatory processes and actually shorten life rather than prolong it. At the present time we believe that the results do not justify the use of high voltage roentgen therapy in any operable case. The same holds true in any inoperable one complicated by pulmonary suppuration, except possibly in an attempt to relieve pain. Irradiation is being given further trial in those inoperable cases presenting no evidence of associated infection.

The intrabronchial insertion of radium for lesions in a stem bronchus and thoracotomy with direct insertion of radon seeds into peripherally located tumors has been

From the New England Deaconess Hospital.

1. Koletsky, Simon: Primary Carcinoma of the Lung, Arch. Int. Med. **62**: 636 (Oct.) 1938.

2. Jaffé, R. H.: The Primary Carcinoma of the Lung, J. Lab. & Clin. Med. **20**: 1227 (Sept.) 1935.

3. Graham, E. A.; Singer, J. J., and Ballon, H. C.: Surgical Diseases of the Chest, Philadelphia, Lea & Febiger, 1935.

4. Simons, E. J.: Primary Carcinoma of the Lung, Chicago, Year Book Publishers, Inc., 1937.

5. Dublin, L. I.: Statistics on Morbidity and Mortality from Cancer in the United States, Am. J. Cancer **29**: 737 (April) 1937.

recommended by Edwards.[6] Beneficial effects were reported in the way of canalization of the bronchus, local disappearance of the tumor, as seen bronchoscopically, and symptomatic improvement. Specific case reports with histologic data were not given. It was admitted, however, that end results as regards cure were necessarily poor.

TABLE 1.—*Incidence of Primary Carcinoma of Lung in Autopsies*

Author Reporting Cases	Reference	Total Number of Autopsies	Total Number of Carcinomas	Number of Primary Carcinomas of Lung	Percentage of Primary Carcinoma of Lung to Total Carcinomas
Jaffé	2	6,800*	876	100	11.4
Jaffé	2	4,500	...	...	10.7
Koletsky	1	7,685	1,064	100	9.4
Frissell and Knox	10	2,415	442	38	8.5
Matz	14	7,398	1,167	160	13.7
Various authors reported by Simons	4	30,307	.....	...	6.3 to 18.5

* Not included in total of 52,305 because it is included in the cases reported by Simons.

We have not considered the evidence supporting the use of radium in treating cancer of the lung convincing enough to justify its use. On theoretical grounds the danger of increasing bronchial obstruction and aggravating the associated suppurative processes far outweighs the remote chance that the tumor would be destroyed or even retarded in its growth. None of the patients in our series have been treated in this way.

Treatment of primary carcinomas of the lung by endobronchial fulguration has been reported. Some of the so-called cures by this method have been in cases in which the identity of the tumor was mistaken. It is theoretically possible for a primary cancer, occurring as a small papillary intrabronchial tumor, to be completely removed by this method. Such cases from a practical standpoint, however, are extremely rare. In our experience we have seen but one instance in which the tumor was apparently completely removed bronchoscopically with no evidence of recurrence during a two year period. In every case in our series in which surgical excision was carried out the tumor was found to have extended through the bronchial wall into the parenchyma of the lung. Obviously, endobronchial therapy would not have been suitable in any of these cases.

TABLE 2.—*Percentages of Primary Lung Cancers to All Cancers in Autopsies (Graham [8])*

Year	Per Cent
1896-1901	0.54
1902-1916	5.02
1914-1919	6.36
1920-1925	10.30

DEFINITE HOPE OFFERED BY SURGERY

Fortunately the outlook for the patient with primary carcinoma of the lung now appears to be much brighter, owing to the introduction of surgical excision of lung tissue as a practical therapeutic procedure. The place that this form of treatment will ultimately take in the therapy of primary carcinoma of the lung is yet unsettled. This place will be dependent on three factors: (1) early diagnosis at a time when excision can be carried out before extension or metastasis has occurred, (2) a relatively low operative mortality rate, and (3) a reasonable chance of cure without excessive permanent disability. With regard to the first prerequisite, it is obvious that almost all the responsibility of early diagnosis falls on the shoulders of the general practitioner, who must suspect obscure pulmonary lesions of being due to primary malignant disease and immediately carry out all the diagnostic procedures that are available to him and then, without delay, ask for whatever aid he may need in carrying out the special examinations that are necessary to prove or disprove the presence of this disease. That a great deal of progress has been made, through the alertness of the physician and his cooperation with the roentgenologist and bronchoscopist, is evidenced by the great difference in percentage of correct antemortem diagnoses made in the past five years, as compared with those made at the beginning of the twentieth century. Sehrt [7] in 1904 reviewed 178 collected cases, proved by autopsy, and found that the correct antemortem diagnosis was made in only 3.3 per cent of the entire group. In a series of cases of obscure chest lesions studied by us in which the symptoms or examinations suggested primary malignancy, this diagnosis was established histologically in the living subject in approximately 90 per cent. Of the proved cases, 24 per cent were diagnosed at an operable stage and pneumonectomy or lobectomy was carried out. With continued interest in the problem there is no reason why the percentage of clinical discoveries at an operable stage should not steadily increase.

TABLE 3.—*Duration of Life of Patients Receiving High Voltage Roentgen Therapy and Untreated Patients*

Group	Number of Patients	Duration of Life from Onset of Symptoms to Death	Duration of Life from Time of Diagnosis (or Beginning of Irradiation)* to Death
Irradiated	13	13.0 months	5.6 months
Not irradiated	26	20.1 months	8.0 months

* High voltage roentgen therapy was begun as soon as the diagnosis was established in the cases in which it was used.

It can be shown that progress has been made with regard to the surgeon's ability to resect a human lung safely. Between 1933 and 1936 one of us (Overholt) resected an entire lung for a primary malignant growth or for pulmonary suppuration in twelve cases, with an operative mortality of 33⅓ per cent. Between 1937 and 1939 the operative mortality rate in twelve cases similarly treated was 16⅔ per cent. These figures compare favorably with those pertaining to total resection of abdominal organs for malignant conditions and are certainly not prohibitive when it is realized that a disease is being dealt with that is 100 per cent fatal without surgical treatment.

With regard to the third prerequisite, our present knowledge of the ultimate outcome of the patient who has been subjected to pneumonectomy should certainly make us feel hopeful. The first patient treated by Overholt survived pneumonectomy for primary cancer of the lung and is still living and well with no evidence of recurrence five years and four months after operation. The second patient will pass the five year mark in one month, and others have been living without evidence of recurrence for shorter postoperative periods. These

6. Edwards, A. T.: Tumours of the Lung, Brit. J. Surg. **26**: 166 (July) 1938.

7. Sehrt, quoted by Simons.[4]

patients carry on normal lives, are not unduly limited in their physical activities and show no obvious deformity.

CLINICAL AND PATHOLOGIC CONSIDERATIONS

The great variation of symptoms and clinical manifestations found in primary carcinoma of the lung can be better understood by first considering the pathologic changes that produce them. The general consensus now is that all primary carcinomas of the lung arise from a single undifferentiated parent cell located in the basal layer of the bronchial epithelium, regardless of whether the site of origin is in the main stem bronchi or in the terminal bronchioles.[4] The degree of differentiation of this parent cell determines whether the tumor will be a squamous cell carcinoma, an adenocarcinoma, an undifferentiated round cell, spindle cell or "oat cell" type, or a combination of two or more of these, which is seen not infrequently. From a clinicopathologic standpoint the symptoms and signs may conveniently be divided into several stages. This division will obviously not be possible in every case but will probably prove helpful in most instances.

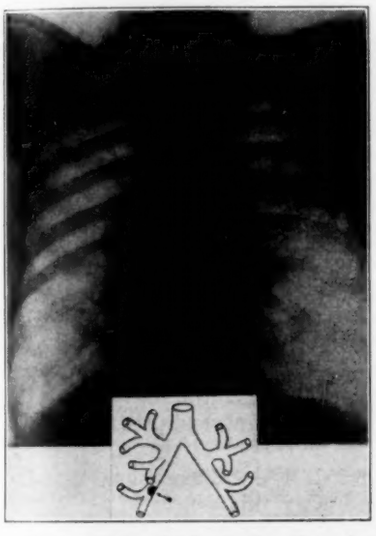

Fig. 1.—Chest of Mr. I. B. Note that the slight alteration in the axis of the ribs, the slight shift of the heart to the right and the minimal amount of increased density adjacent to the right heart border could very easily be overlooked. Because of the persistent cough and discomfort in the chest, even in the absence of definite roentgenologic changes suggesting carcinoma of the lung, a bronchoscopic examination was done. A small tumor in the stem bronchus of the right lower lobe was seen and a biopsy specimen obtained bronchoscopically. Microscopic examination proved it to be a primary epidermoid carcinoma grade 2. Pneumonectomy was successfully carried out.

1. *Stage Before Bronchial Occlusion.*—Soon after the tumor begins to grow, its presence causes irritation of the sensitive bronchial mucosa, which results in a dry, irritative cough. This is by far the earliest, most constant and therefore most important symptom in the majority of cases. Since the cough is ineffectual in removing the irritating agent, an increased amount of bronchial secretion is produced in an attempt to wash out the irritant. This results in the next frequent early symptom, which is a clear, thin, mucoid sputum. As the tumor enlarges, the trauma from coughing, as well as the tendency for the tumor tissue to undergo degeneration, produces ulceration of its surface, which accounts for the appearance of blood streaked sputum and a tendency for the sputum to become purulent. These are both frequent early symptoms. Physical manifestations and changes demonstrable on the roentgenogram are not present during this stage, because the tumor is not large enough to cast a shadow and the changes incident to bronchial occlusion have not yet appeared. Still it is important to realize that the diagnosis usually can be definitely established by bronchoscopic examination, even at this early period, because the majority of primary carcinomas of the lung arise in the stem bronchi, so that they fall within the range of bronchoscopic accessibility (fig. 1).

2. *Stage of Bronchial Occlusion.*—A. Partial Occlusion with Emphysema: Further increase in the size of the tumor causes partial obstruction of the bronchus. In spite of this, air can still be forcibly drawn past the obstructing tumor during the powerful inspiratory phase of respiration. It is impossible for this air to escape completely from the affected segment of lung because

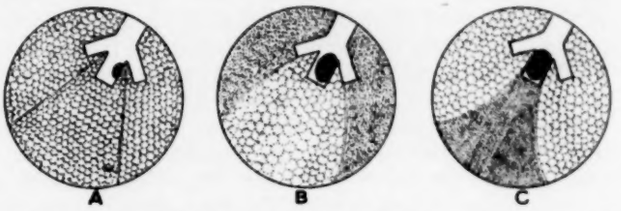

Fig. 2.—Effects of bronchial occlusion due to early carcinoma: *A*, lung segment normal before occlusion; *B*, segmental emphysema due to partial occlusion; *C*, segmental atelectasis due to complete occlusion.

the relatively weak elastic recoil of the lung tissue is not strong enough to force all the inspired air past the point of obstruction before the next inspiration occurs. This results in emphysema of the segment of lung supplied by the affected bronchus and produces the wheezing or asthmatic breathing which is another frequent early symptom. On physical examination during this stage of the disease a hyperresonant percussion note may be found over the involved area. The breath sounds are often emphysematous, with moist expiratory rales and rhonchi. The roentgenogram may show a wedge-shaped area of decreased density with convex limiting borders (fig. 2). Partial occlusion of a bronchus is responsible for the erroneous diagnosis of asthma which is not infrequently made. In the great majority of cases this phase of the disease is apt to be of short duration, owing to the relatively small size of the bronchial lumen and the rapidity with which even a small growth will produce complete occlusion.

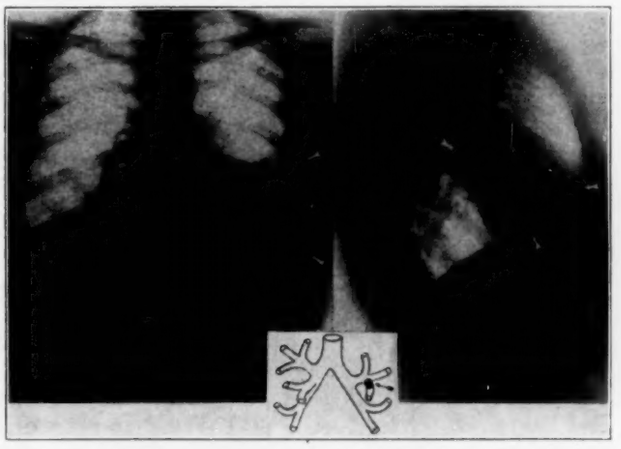

Fig. 3.—Chest of Mrs. E. H., showing a diffuse homogeneous shadow in the postero-anterior exposure produced by atelectasis of the lingular segment of the left upper lobe. The lateral exposure localizes the atelectatic segment to the anterior-inferior portion of the upper lobe. Note the absence of marked mediastinal shift, elevation of the diphragm and narrowing of the intercostal spaces due to the ability of the lower lobe and uninvolved portions of the upper lobe to compensate for the shrinkage of the lingular segment. Bronchoscopic biopsy proved the tumor to be a carcinoma simplex. This patient is well, with no evidence of recurrence, four years eleven months after pneumonectomy.

B. Complete Occlusion with Atelectasis: The complete occlusion of the bronchus to a segment of lung or a lobe produces still a different picture. Atelectasis occurs and the airless segment becomes shrunken and functionless. Dyspnea, which is another frequent early

symptom, appears not alone because of the decrease in lung volume but also probably because of the mediastinal shift, which displaces the trachea and interferes with heart action. The discomfort or feeling of weight and constriction in the chest so often noted during this period is probably due to a reflex spasm of the intercostal muscles and the smooth muscle in the walls of the bronchial tree. Pain of any severity is not a part of the picture of early carcinoma of the lung and, when present, is usually due to pleurisy resulting from a complicating inflammatory process. The absence of pain should not be considered evidence against the presence of primary carcinoma of the lung. The severe pain usually described as being an outstanding symptom of this disease occurs in the later stages as a result of extension or metastasis of the tumor to the pleura, bones, nerve structures or other organs.

Atelectasis is by far the most frequent pathologic change giving rise to physical manifestations at an early stage. The manifestations incident to uncomplicated atelectasis are diminished to absent tactile fremitus, dulness to flatness on percussion and diminished breath sounds, which, if audible at all, are of bronchovesicular or bronchial quality. Associated with these changes will be a varying degree of mediastinal shift toward the affected side, with diaphragmatic elevation and narrowing of the intercostal spaces. The roentgenologic

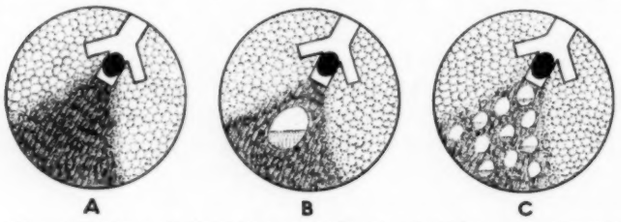

Fig. 4.—Effects of bronchial occlusion plus infection: *A*, segmental atelectasis with diffuse pneumonitis; *B*, segmental atelectasis with large abscess showing fluid level; *C*, segmental atelectasis with pneumonitis and multiple cavities.

appearance is again due, in most cases, to atelectasis, which characteristically produces a dense, wedge-shaped shadow with concave borders extending from the hilus out to the chest wall (fig. 2). It must be remembered that, if the atelectatic segment extends from the hilus posteriorly or anteriorly, the shadow may not appear to reach the periphery of the lung in the anteroposterior film; but if lateral and oblique exposures are taken it may clearly be shown to do so (fig. 3). These additional films are important in a study of patients suspected of having bronchial occlusion. An excellent treatise on the roentgenologic aspects of bronchostenosis, which is well worth studying, has recently been prepared by Westermark.[8] Again, a varying degree of mediastinal shift, diaphragmatic elevation and narrowing of intercostal spaces will be associated, depending on the size of the segment of the atelectatic lung. It is notable that the tumor per se casts a shadow on the roentgenogram in only a small percentage of cases at an early stage. This is more apt to occur in peripherally located lesions.

C. Bronchial Occlusion with Secondary Infection: With bronchial occlusion and ulceration, secondary infection of the bronchial tree usually occurs because the ability of the ciliated epithelial cells to sweep out contaminating bacteria is impaired. This may progress into bronchitis, bronchiectasis, varying degrees of pneumonitis, abscess or even gangrene of an entire lung. The type of infection that develops depends mainly on the size of the affected bronchus and the virulence and type of infecting organisms present. In the cases of carcinoma collected by Simons,[4] approximately one third of the entire group presented evidence of pulmonary infection. One must therefore be aware of the frequent occurrence of secondary infection and not be found guilty of treating a patient for "unresolved pneumonia," "bronchitis" or "pleurisy" while he is dying of primary carcinoma.

The symptoms and signs that appear during this phase of the disease obviously will vary considerably, depending on the nature and severity of the complicating inflammatory lesions and the prominence of the symptoms and signs due to the uncomplicated bronchial occlusion. With the development of diffuse bronchitis or bronchiectasis, cough productive of a varying amount of more or less purulent sputum will be present. If the tumor now causes complete obstruction to drainage from the bronchial tree the patient will soon become acutely ill, owing to the pulmonary infection, and may present the clinical picture of pneumonia. Drainage may suddenly be reestablished owing to breakdown of the obstructing tumor or decrease in the surrounding edema, so that the patient may expectorate a large amount of sputum, after which he will feel much better until the bronchus again becomes occluded. The acute pneumonic symptoms will then reappear. Such a sequence of events is relatively common and is responsible for the diagnosis of "recurrent pneumonia" which is made at times. If there is considerable destruction of the lung due to infection or breakdown of the tumor, cavitation will result. Thus lung abscess may be closely simulated, since in reality abscess in this phase of the disease would be the outstanding pathologic process present (fig. 4). With the development of other inflammatory lesions, other symptom complexes will be found.

As might be expected, the observations made on physical examination during this phase of the disease are also extremely variable and are not characteristic of carcinoma of the lung, since there are so many factors involved in their production. If the suppurative complications predominate, the usual signs of bronchitis or bronchiectasis or of the consolidation resulting from pneumonitis will be present. If cavitation occurs following excavation of an abscess, changes due to this lesion will be present. Now when one sees a case in which manifestations resulting from the inflammatory lesions are intermingled with those resulting from the primary partial or complete bronchial occlusion it becomes apparent that there may be an endless number of different physical conditions found.

The roentgenologic appearances present during this stage are those of the uncomplicated bronchial occlusion already described plus the changes incident to the various inflammatory processes that may be present. The homogeneous appearance of the atelectatic shadow is frequently mottled by the infectious process, and at times multiple small areas of cavitation appear. Also the margins of this shadow are often hazy and indefinite, owing to adjacent pneumonitis (figs. 4 and 5).

3. *Stage of Extension or Metastases.*—There are many other symptoms, physical signs and roentgenologic changes that are due to extension of the tumor or metastases, such as dysphagia, abnormal symptoms of the central nervous system, phrenic nerve paralysis, dilated veins of the neck, chest wall or upper extrem-

8. Westermark, Nils: On Bronchostenosis: A Roentgenological Study, Acta radiol. **19**: 285, 1938.

ities, and diffuse carcinomatous infiltration of the lung; but these are all signs of the disease at a time when the possibility of cure has passed and are therefore relatively unimportant clinically, so they will not be considered further.

In considering the effects of bronchial occlusion in the various stages mentioned, it is important to realize that the severity of symptoms and the prominence of physical and roentgenologic changes will be directly proportional to the size of the affected bronchus. Thus, if a main stem bronchus is occluded, the symptoms will be severe and the appearances unquestionable. However, if a small peripheral bronchus is affected the symptoms will be insignificant, the physical manifestations will be localized to a small area so that they will almost surely be overlooked, and the roentgenologic changes will be minimal. It is important also to be aware of the fact that the shadow cast on the roentgenogram incident to bronchial occlusion may not correspond exactly to the gross anatomic distribution of one of the five pulmonary lobes because, in the first place, only one branch of one of the lobar bronchi may be affected, and, in the second place, the shadow will be distorted, in the case of emphysema by distention and enlargement and in the case of atelectasis by collapse and shrinkage.

It should be emphasized that symptoms and signs of one or all of the aforementioned stages may be present at one time. This is possible because, for example, a tumor arising in the main middle lobe bronchus may produce complete obstruction, with atelectasis of the entire middle lobe, while the extrabronchial portion of the same tumor may produce partial occlusion of the bronchus of the lower lobe resulting in emphysema of the lower lobe. Thus two stages may be represented at one time. Now, if infection develops in either the atelectatic or the emphysematous segment, symptoms and signs of a third stage may appear. If the tumor metastasizes, manifestations of the terminal stage may also be present.

ANALYSIS OF AUTHORS' SERIES OF CASES

This analysis is based on the study of seventy-five cases in which the diagnosis of primary carcinoma of the lung has been proved histologically. The only significant predisposing etiologic factors found were age and sex. The average age of these patients was 50 years; the youngest was 18, and the oldest 68. Fifty-four of the patients were men and only twenty-one were women, a ratio of 2.6 to 1.

For the purpose of study these patients were arbitrarily separated into two groups, one in which the tumors were located in a stem bronchus and the other in which the lesions were located peripherally. In the stem bronchus group there were fifty-seven cases (76 per cent) and in the peripheral group eighteen cases (24 per cent). The main practical difference between the two groups is that the lesions in the stem bronchus group fall within the range of the bronchoscope, which facilitates preoperative diagnosis, while the tumors located peripherally are not accessible to bronchoscopic examination. Therefore, in most of these cases exploratory thoracotomy must be done to establish the diagnosis definitely. Some of these tumors may possibly be removed by lobectomy rather than by pneumonectomy, owing to their distant location from the hilus.

SYMPTOMS

The symptoms found in this series of cases and the relative frequency of occurrence in the two groups is shown in table 4.[9] Cough was by far the most common and earliest symptom, being present in 87 per cent of the entire group. At the onset in most cases it was dry and irritative. It soon became productive of a clear, odorless, mucoid sputum which, as the disease progressed, changed to a more purulent character, depending on the amount of infection and ulceration that developed. Fever was present in 53 per cent of the cases and was definitely more frequent in the stem bronchus group. This again brings up the importance of recognizing the frequent occurrence of secondary inflammatory changes, which often dominate the clinical picture and mask the presence of the primary lesion until the operable stage of the disease has passed. Chest pain or discomfort, in the form of a dull ache or heavy sense of constriction, was present in 44 per cent. Pain of any great severity was not found early in the great majority of cases and, when present, could be accounted for by inflammatory processes. Hemoptysis was present in 38 per cent of the total group and was more common in the peripheral lesions. This was, at an early stage, streaking of the sputum with bright red blood and, less frequently, raising of old blood of a brownish red color.

TABLE 4.—*Occurrence of Symptoms in Authors' Cases*

Symptoms	Stem Bronchus Group (52 Cases)		Peripheral Group (16 Cases)		Entire Group (68 Cases)	
	Number	Per Cent	Number	Per Cent	Number	Per Cent
Cough	46	88.4	13	81.2	59	86.7
Fever	29	61.5	7	43.7	36	52.9
Pain or discomfort	21	40.3	9	56.2	30	44.1
Hemoptysis	18	34.6	8	50.0	26	38.2
Weight loss	18	34.6	8	50.0	26	38.2
Dyspnea	16	30.7	5	31.2	21	30.8
Weakness	10	19.2	1	6.2	11	16.1
Chills	8	15.3	0	0.0	8	11.7
Gastrointestinal symptoms	5	9.6	1	6.2	6	8.8
Wheezing or asthma	5	9.6	0	0.0	5	7.3

Note: Sputum not represented but was present in majority of cases in which there was cough.

Massive hemorrhage occurred only in advanced cases. Dyspnea or wheezing was present in 38 per cent of the cases and was frequently an early symptom. The other symptoms mentioned in table 4 were present in the more advanced cases. No group or complex of symptoms was found which could be called characteristic of the disease.

PHYSICAL SIGNS

Physical manifestations were present in 93 per cent of all cases but were so variable that little reliance was placed on them. They usually simulated the pathologic changes produced by the conditions from which carcinoma of the lung must be differentiated.

ROENTGENOLOGIC ASPECTS

Definite changes were present on the roentgenogram in 96 per cent of the cases. The most frequent finding was the shadow cast by the tissue of the atelectatic lung, in lobar or lobular distribution, with the accompanying changes in the mediastinum and thoracic cage previously mentioned (fig. 3). These changes were present in 85.3 per cent of all cases. In a small number of cases, changes resulting from segmental emphysema were associated. Evidences of a

9. The figures regarding the occurrence of symptoms are taken from a study of sixty-eight cases recently reported (Overholt, R. H., and Rumel, W. R.: Clinical Studies of Primary Carcinoma of the Lung, Journal-Lancet **59**: 155 [April] 1939).

superimposed inflammatory process were also frequently present (fig. 5). A shadow of the tumor itself was cast in only 17 per cent of the cases, and the majority of these were in the peripheral group. Here the shadow produced was in the form of a rounded area of increased density with a margin, which in some cases was quite smooth and well demarcated from the

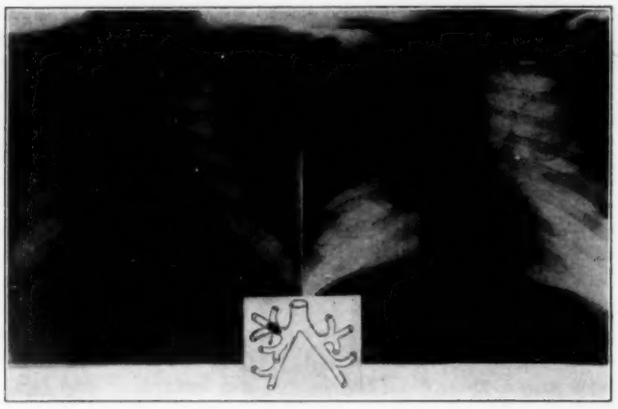

Fig. 5.—Chest of Mr. J. F., showing the shadow produced by atelectasis of the left upper lobe with additional changes incident to secondary infection. The mottling due to diffuse pneumonitis and multiple abscess formation is best shown on the overexposed film. Bronchoscopy with biopsy proved the primary lesion to be an undifferentiated carcinoma originating in the bronchus of the left upper lobe. The lesion was found to be inoperable at the time of bronchoscopic examination.

surrounding lung tissue (fig. 6), while in others it was softer, infiltrative and more irregular. The dense, homogeneous, wedge-shaped shadow with concave margins typical of atelectasis, often associated with a shift of the mediastinum, was found to be quite characteristic. However, this appearance does not invariably indicate the presence of primary carcinoma of the lung, since any lesion which obstructs a bronchus can produce such a shadow.

DIAGNOSTIC PROCEDURES

I. *Bronchoscopy.*—Bronchoscopic examination is by far the most valuable single diagnostic procedure in studying patients suspected of having primary cancer of the lung, for the following reasons:

1. Approximately three fourths of all primary lung tumors are situated in the major bronchi, so that they are within the range of bronchoscopic vision. In our group of fifty-five stem bronchus lesions in which bronchoscopy was done a biopsy of tumor tissue was obtained in fifty-three instances, thus furnishing microscopic proof of the diagnosis.

2. Bronchoscopy is the only safe and practical means of obtaining a biopsy in the stem bronchus group. This cannot be said for transthoracic aspirational biopsy.

3. In the great majority of cases the diagnosis can be made much earlier than by any other method.

We feel, therefore, that there is no real justification for postponing bronchoscopic examination of a patient in whom a dry or productive cough develops, alone or associated with hemoptysis, wheezing, dyspnea, chest discomfort or other symptoms suggestive of early primary carcinoma of the lung that cannot be definitely explained on some other basis. We feel that this is true even in the absence of physical manifestations and roentgenologic changes, especially if the patient is of "cancer age" and has previously been symptom free. We can see no logical reason why one should await the development of additional symptoms, physical signs or abnormalities on the roentgenogram when these changes, even at an advanced stage of the disease, furnish merely presumptive evidence of the presence of primary carcinoma of the lung.

Aside from being the most important diagnostic procedure available, bronchoscopy is also valuable in determining the operability of a given tumor and at times it is helpful as a therapeutic measure. If a tumor is seen on bronchoscopic examination to extend into the wall of the trachea, it may have to be considered inoperable from a technical standpoint. If the trachea and mediastinal structures are firm and fixed, or if the angle of the carina is widened or distorted, it is very probable that these changes are due to the growth of metastatic tumor tissue in the mediastinal glands around the bifurcation of the trachea, thus making the case inoperable.

A patient may become gravely ill as a result of pulmonary suppuration distal to an obstructing tumor, which prevents adequate drainage of pus from the bronchial tree. In such cases bronchoscopic dilation may temporarily relieve the obstruction and improve the patient's general condition, enabling him to withstand excision of the tumor, which he would otherwise be unable to tolerate. It is important to know that a patient may be seriously ill because of secondary suppurative processes in the lung and still have a cancer that has not become inoperable. Such a patient certainly deserves a bronchoscopic examination, followed by whatever endobronchial or surgical treatment is deemed advisable by the thoracic surgeon.

Since bronchoscopic examination is such an important part of the routine study of the patient presenting symptoms or signs which may be due to primary carcinoma of the lung, it is hoped that this procedure will not be used as a last resort in making a diagnosis after all other methods have failed and much valuable time has been wasted. The importance of delay can be better understood if it is realized that a disease is being dealt with in which the time from appearance of symptoms until death is short, as is shown in the following groups of cases: Jaffé[2] approximately five months, Frissell and Knox[10] approximately seven and one half months and Koletsky[1] approximately nine months. It becomes obvious that if one expects to save the patient who is suffering from a disease which runs such a rapid course one must act quickly in arriving at the correct diagnosis before the stage of operability has passed. The following thought expressed by Rienhoff,[11] seems especially applicable to the subject under consideration.

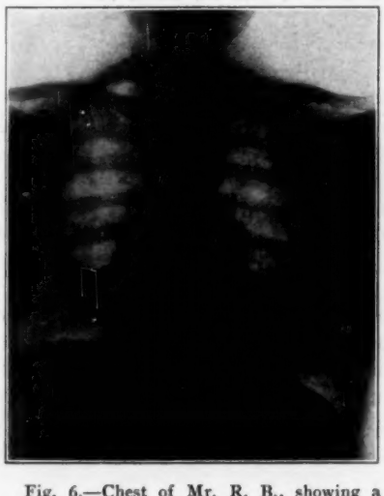

Fig. 6.—Chest of Mr. R. B., showing a round, well circumscribed peripheral shadow in the right lower lobe cast by a bronchiogenic adenocarcinoma. No evidence of extension of the tumor was found at the time of exploratory thoracotomy, so lobectomy was performed. The patient survived the operation and is at present perfectly well, with no evidence of recurrence, sixteen months after the operation.

10. Frissell, L. F., and Knox, Leila Charlton: Primary Carcinoma of the Lung, Am. J. Cancer **30**: 219 (June) 1937.

11. Rienhoff, W. F., Jr.: Carcinoma of the Lung, Surgery **1**: 125 (Jan.) 1937.

He says: "Our clinical pace must be quickened, for until recently the great majority of recognized affections of the respiratory tract have been those in which Time was felt to be the Great Healer, but with the development of methods by which patients can not only be relieved but cured of malignant neoplasms of the lung, it may be said that Time now takes on the role of executioner."

Fig. 7.—Artist's reproduction of the left lung of Mr. J. S., which was surgically removed. To facilitate illustration, the specimen was sectioned through the stem bronchi to expose the tumor. From its point of origin in the bronchus of the left upper lobe the tumor had extended peripherally through the parenchyma of the lung to produce a sunken, puckered appearance of the opposite visceral pleura (inset). Microscopic examination proved the tumor to be an epidermoid carcinoma grade 3. Unfortunately this patient died after the operation.

II. Bronchography after the injection of iodized oil may aid in the diagnosis of tumors which are out of the range of bronchoscopic vision, but we feel that this procedure should be used only if the results of bronchoscopy are negative. Reliance cannot be placed on a negative bronchographic examination alone, and if it is positive bronchoscopy must still be carried out to complete the study of the case by visualizing the tumor and obtaining a biopsy specimen for microscopic examination.

III. The demonstration of malignant tissue in the sputum, as reported by Dudgeon and Wrigley [12] and later by Barrett,[13] has in a limited series of our cases proved disappointing.

IV. Aspirational biopsy is a dangerous procedure, since pleural infection may follow withdrawal of a needle from an infected lung through the pleural space, and we feel that it has no clinical value except to establish the diagnosis in cases which are obviously inoperable. This statement is believed to be true because, if the biopsy is positive in a suspected case without clinical evidence of metastasis, exploratory thoracotomy is indicated, and if the biopsy is negative in the same type of case the same exploration is still the next step in its management.

V. Exploratory thoracotomy was carried out in thirty-eight (50.6 per cent) of the seventy-five cases in this series. None of these patients had demonstrable evidence of metastasis before exploration. We believe that this procedure is indicated in any case in which the diagnosis of primary carcinoma of the lung has been established or is suspected, because of the presence of suggestive symptoms, physical manifestations or roentgenologic changes, just as an exploratory laparotomy is indicated in a suggestive lesion in the stomach or bowel, where the presence of a malignant growth cannot be excluded. Fortunately in the majority of instances the diagnosis can be proved preoperatively by bronchoscopic examination. In most cases in which this is not possible the tumors are located peripherally, so that the diagnosis can be definitely established at the time of exploration. Before thoracotomy is done, one should be sure that there is no clinical evidence of metastasis. Careful neurologic examination should be done to rule out involvement of the central nervous system. Biopsy of enlarged cervical glands should be done if they are found. Skeletal roentgenograms should be taken to rule out metastases to the bones. Fluoroscopic examination should be carried out to exclude the presence of diaphragmatic paralysis, since this is almost a sure sign of extension of the disease. Mediastinal infiltration should be ruled out by bronchoscopic examination.

OPERABILITY

In the group of seventy-five cases lung resection was carried out in twenty-one—pneumonectomy in seventeen and lobectomy in four (fig. 7). Fulguration was possible in only one instance. Two cases in which

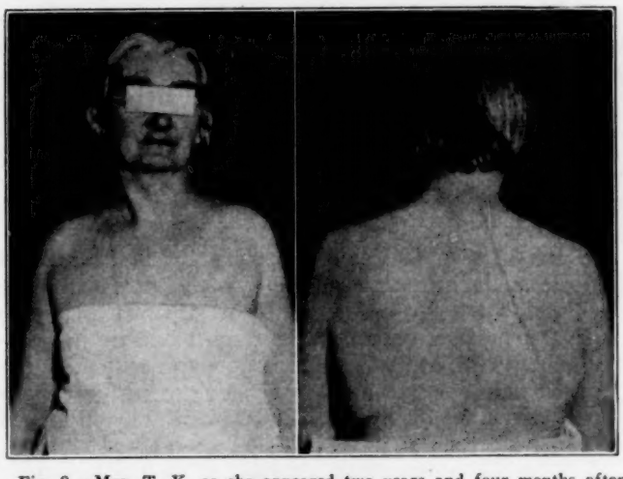

Fig. 8.—Mrs. T. K. as she appeared two years and four months after pneumonectomy for a primary small cell carcinoma of the left upper lobe. She feels perfectly well and has done all her work as a housewife for the past two years. Note the absence of significant deformity and the satisfactory state of nutrition of this patient.

resection was done were apparently operable at the beginning of the operation, but before the excision was completed evidence of mediastinal metastasis was found. In two other cases extension of the tumor into the chest wall had occurred. These were treated by removal of a block of chest wall with the affected lung. In the final analysis there were eighteen cases (24 per

12. Dudgeon, L. S., and Wrigley, C. H.: On the Demonstration of Particles of Malignant Growth in the Sputum by Means of the Wet-Film Method, J. Laryng. & Otol. **50**: 752 (Oct.) 1935.
13. Barrett, N. R.: Examination of the Sputum for Malignant Cells and Particles of Malignant Tissue, J. Thoracic Surg. **8**: 169 (Dec.) 1938.

cent of the entire group) in which no evidence of metastasis or extension of the tumor was found at the time of the operation.

RESULTS OF SURGICAL TREATMENT

Of the four patients treated by lobectomy, three recovered from the operation and were discharged as improved. One patient had direct extension of the tumor into the chest wall and another had metastases to the mediastinal glands which were resected. Both of these patients have since died. The third patient died after the operation, and the fourth is living and well sixteen months after the operation.

In the group of seventeen for whom pneumonectomy was done, six patients died within two months of the operation; these deaths are considered operative deaths. Three patients died after making an operative recovery. It is significant to note that only one of these succumbed as a result of definite recurrence of malignant disease. This death occurred six months after the operation. The second patient died a year after the operation as a result of a psychosis. Complete postmortem examination of this patient revealed no evidence of a malignant growth. The third late death occurred two years after operation, from an unknown cause. Unfortunately an autopsy permit was not obtained. However, three and one half months before death the patient had no demonstrable evidence of a recurrent malignant growth on clinical and roentgenologic examination.

Eight patients treated for primary lung cancer by pneumonectomy are living and well with no evidence of recurrence of the malignant condition. They are all able to carry on the same activities in which they were engaged before the operation. Not one has significant cardiorespiratory embarrassment and, when clothed, not one has obvious deformity (fig. 8). The longest periods of survival postoperatively are five years four months, four years eleven and one-half months and two years ten and one-half months.[14]

CONCLUSIONS

1. Primary carcinoma of the lung is a relatively common disease which is responsible for approximately 10 per cent of all cancer deaths.
2. In this clinical study seventy-five patients had histologically proved primary carcinoma of the lung.
3. Partial or complete bronchial occlusion, with or without secondary infection, produces the most important pathologic lesions giving rise to early symptoms, physical manifestations and roentgenologic changes.
4. Bronchoscopic examination is by far the most important diagnostic procedure available and should be used without delay in the study of any case in which a dry or productive cough develops alone or in association with hemoptysis, wheezing, dyspnea, chest discomfort or other symptoms suggestive of early primary carcinoma of the lung that cannot be definitely explained on some other basis.
5. The diagnosis was established with histologic verification at an operable stage in 24 per cent of the seventy-five cases.
6. Lobectomy and pneumonectomy are practical therapeutic procedures, without an excessive operative mortality rate, which at the present time appear to offer a good chance of survival to the patient suffering from primary carcinoma of the lung.

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14. At the time the authors' proof was submitted, Feb. 3, 1940, all of the patients were still alive and well without evidence of metastatic disease. The longest survival periods were then six years three months, five years ten months and three years ten months.

PREVENTIVE PEDIATRICS

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Whether or not the cost is borne by taxation, private fees or local charity,[1] prevention is the most important phase of pediatrics and should be extended both by general practitioners and by pediatricians. "He who cures a disease may be the most skilful, but he who prevents it is the safest physician." Three fourths of the quarter of a million annual deaths of American children [2] can and should be prevented. Twenty-one per cent of these deaths are due to curable diseases, while 56 per cent are caused by preventable conditions (table 1). The public should be educated to utilize the facilities available at present.[1]

During the last thirty-three years much has been accomplished, and the infant mortality rate in New York City, for example, has fallen from 140 per thousand living births to 55. This decrease has been mainly in the diarrheal deaths and probably is due to a better milk supply and more intelligent infant feeding. The mortality rate of tuberculosis and the respiratory and infectious diseases also has been reduced, though to a lesser extent. Unfortunately, the diseases peculiar to early infancy kill nearly as many now as in 1898. In spite of a general belief to the contrary and although still more must be done, the reduction in infant mortality in the United States can be compared favorably with that of many other civilized countries. For instance, in 1900, 190 of every thousand German infants and 290 per thousand of those in Breslau died during their first year, while in 1933 only 80 per thousand succumbed.[3] In this country, in 1915 the infant mortality under the age of 1 year was 100, but in 1936 it was 57.[4] During this period, the reduction in the deaths among infants in the second to the twelfth month of life was 56 per cent but in those in the first month of life only 27 per cent. The variation in infant mortality, however, in the several states leaves much to be desired, ranging from a maximum of 136 in one state to a low point of 39 in the state of Washington.

ANTEPARTUM, INTRAPARTUM AND POSTPARTUM CARE

The problem of prevention can be simplified by dividing it into its two constituent parts, antepartum (including intrapartum and neonatal measures) and postpartum care. The need for better antepartum, intrapartum and neonatal care is emphasized by the fact that over half of the deaths in this country under the age of 1 year (thirty-four of fifty-seven) occur under the age of 1 month (table 2).[4] Improved antepartum care and the antepartum hospitalization of mothers who need it can and must be supplied through the cooperation of general practitioners, obstetricians, pediatricians, health officials, nurses and hospitals. That such joint effort is efficacious has been demonstrated

From the Department of Pediatrics, Duke University School of Medicine, and Duke Hospital, with the cooperation of Drs. J. A. Hayne, W. F. Draper, J. M. Parrott, Oren Moore, Bayard Carter, L. T. Royster and William Weston (Report of a Committee on Infant Mortality in North and South Carolina, and Virginia) and of Miss Judith Farrar, librarian of Duke Hospital.

1. Davison, W. C.: The Future of American Pediatrics, J. Pediat. **14**: 810 (June) 1939.
2. Mortality Statistics, 1927-1933, Part 1, Tables and General Tables, United States Department of Commerce, Bureau of the Census.
3. Stolte, Karl, cited in Berlin Letter, J. A. M. A. **104**: 230 (Jan. 19) 1935; Statistiches Jahrbuch Deutsche Reich, 1934.
4. Summary of Live Birth, Infant Mortality and Stillbirth Statistics in the United States, 1933, Department of Commerce, Bureau of the Census; United States Department of Labor, Children's Bureau, Sept. 18, 1935 (5036). Personal communication from Dr. Martha M. Eliot and Dr. T. F. Murphy.

by Gengenbach and his associates in Denver, who reduced the number of infant deaths from 178 per thousand live births to 15 per thousand by antepartum measures.[5] If further proof is required of the need for more and better antepartum care it is supplied by the increase in infant deaths in Durham County, N. C., from 1932 to 1935.[6] As this increase was only among white infants under 1 month of age, it seems logical to assume that many of the white mothers who prior to 1930 could afford antepartum care are not seeking it now, as a result of the depression. Charity antepartum and obstetric clinics are available, but many mothers still regard antepartum care as an unessential luxury. Should not greater efforts be made to persuade expectant mothers not only of the advisability but of the necessity of visiting their physicians or these antepartum clinics at frequent intervals? The antepartum, intrapartum and neonatal measures necessary for the reduction of infant mortality are simple and within the reach of many expectant mothers and of every competent physician.[7] Ignorance of the necessity for antepartum care probably is as important a factor in infant mortality as are poverty and the lack of facilities. One of the main difficulties is in establishing contact between the mother and the physician. The child health program sponsored by the United States Children's Bureau, state and county boards of health and the American Academy of Pediatrics [1] emphasizes this aspect of the problem, through publicity methods urging expectant mothers to go frequently to their physicians as well as through the establishment of antepartum clinics at which obstetric and also contraceptive advice can be obtained.

In order to insure the greatest health to an infant, the prevention of disease should commence as soon as the mother knows that she is pregnant, as her health as well as that of her unborn infant is greatly affected during this period. The changes in organs are sudden. There is a double load on the heart and kidneys. Metabolism is speeded up, and the importance of diet and its effect on both mother and child cannot be overemphasized. Children would be born with a much

TABLE 1.—*The Causes of the 240,000 Annual Deaths Among American Children*

Type of Condition	Number of Conditions	Percentage of Deaths Caused *
Preventable	37	56
Curable	63	21
Remainder	207	23

* Percentage of total pediatric mortality in the United States.

better nutritional foundation if those who look after pregnant women would more carefully apply the available information concerning diet during pregnancy rather than, as is so often the case now, merely saying "Just eat a good general diet," if they mention diet at all.[8] Diet during the last two months of pregnancy is particularly important.[9] Disease of the mother, such as toxemia, nephritis, diabetes, heart disease, tuberculosis or syphilis, also is an important cause of neonatal mortality. Fifty per cent of the infants of diabetic mothers die during gestation or in early infancy. These deaths can be prevented by the adequate insulin therapy of the mother, especially during delivery, and by the intramuscular injection of 10 cc. of 5 per cent dextrose in saline solution into infants to prevent the hypoglycemia which usually occurs during the first few hours of life.[10] The infants of diabetic mothers are larger than the average, and the pregnancy sometimes should be interrupted after the eighth month or whenever the fetus weighs more than 3 Kg. (6⅔ pounds). No patient requires more frequent and detailed checking than does the expectant mother.

Prematurity.—Sixty per cent of infant deaths occur in the first month of life, and nearly half of them are

TABLE 2.—*Causes of Pediatric Deaths * Which Can Be Reduced by Better Antepartum, Intrapartum and Neonatal Care*

Prematurity
Birth injuries
Stillbirths
Conditions of early infancy (atelectasis, asphyxia, suffocation)
Impetigo
Syphilis

* Representing 60 per cent of deaths under the age of 1 year and 26 per cent of the total pediatric deaths.

due to prematurity. Seventy per cent of the deaths of these premature babies take place in the first twenty-four hours; this is more than double the percentage of deaths of full term infants during the first day. The improper use of drugs, analgesics and anesthesia, toxemia of pregnancy, pneumonia and syphilis are responsible for many of the premature deaths. The administration of morphine to the mother within four hours before delivery greatly increases the mortality among premature infants. The most common causes of death associated with prematurity are chilling, injury during resuscitation, malformation and pneumonia. The longer the delivery of a premature infant can be delayed, the greater is the weight of the fetus and the lower the infant mortality, although if the mother has toxemia the risk of a stillborn infant is increased.

Birth Injury.—This factor is the next most common cause of death during the first ten days of life. To reduce its frequency, every pregnant woman should have the diagonal conjugate diameter of her pelvis (from the under surface of the symphysis pubis to the promontory of the sacrum, normally 11.5 to 12.5 cm., or 4½ to 5 inches) measured with a sterile gloved hand in the vagina; if the distance is less than 9.5 cm. (4 inches) she should be delivered in a hospital. Other pelvic measurements are useful, but that of the diagonal conjugate diameter is essential. Most of the maternal and infant deaths due to delivery would be prevented if all births were supervised with sterile surgical technic (not hurried) by competent family physicians, by obstetricians or by trained nurses who have had special obstetric training (not that of the usual midwife). The use of oxytocic preparations and of interfering procedures to initiate labor or to speed delivery greatly increases infant and maternal mortality. A bulletin [7] on this subject can be obtained from the United States Children's Bureau, Washington, D. C.

Stillbirths and Other Deaths of Early Infancy.—Mortality can be reduced if every pregnant woman has her blood pressure determined and her urine, heart and

5. Gengenbach, F. P.: Infant and Maternal Mortality in Denver, J. Pediat. **1:** 719-726 (Dec.) 1932, **3:** 718-729 (Nov.) 1933.
6. Kerner, J. W.: A Shift in the Infant Mortality Rate in Durham County, North Carolina, J. Pediat. **10:** 236-242 (Feb.) 1937.
7. Standards of Prenatal Care, United States Department of Labor, Children's Bureau Publication 153, 1934.
8. Casparis, Horton: Preventive Pediatrics, South. M. J. **30:** 746-750 (July) 1937.
9. Perry, G. G.: An Attempt to Control the Size of the Baby, South. Med. & Surg. **100:** 377-379 (Aug.) 1938.
10. Hartmann, A. F., and Jaudon, J. C.: Hypoglycemia, J. Pediat. **11:** 1-36 (July) 1937.

lungs examined every month during gestation. If the blood pressure is elevated, if the urine contains albumin or sugar or if the woman has vomiting, convulsions, vaginal bleeding, anemia, infections or any cardiac, thyroid, pulmonary or toxic symptoms, she should obtain competent medical or obstetric advice and treatment. The oftener a pregnant woman visits her physician, the greater is the probability of her having a normal living infant.[11] The mother also should visit her dentist two or three times during pregnancy so that her teeth may be kept in good condition.

Atelectasis, Asphyxia and Suffocation.—These conditions often can be eliminated if the mother is not given sedatives during delivery and if the newborn infant, after the air passages are cleared by gentle wiping or suction with a catheter, is given inhalations of 5 per cent carbon dioxide in oxygen for five minutes every four hours for the first day of life. A tracheal catheter may be necessary. Gentle mouth to mouth insufflation is recommended for resuscitation. Patting the soles of the infant's feet before each feeding to insure lusty crying also is useful for atelectasis.

Gonorrheal Ophthalmia.—This disease can be prevented entirely if two drops of a fresh 1 per cent solution of silver nitrate are carefully placed in each eye of the infant (Credé method) immediately after birth (not on the cheeks or closed eyelids, as occasionally happens). In addition to these initial drops of silver nitrate, the instillation of 20 per cent mild protein silver in each eye once daily for the first three days of life is recommended.[12]

TABLE 3.—*Causes of Pediatric Deaths* Which Can Be Prevented by Postnatal Measures*

Accidents	Measles
Anemia	Mumps
Brucellosis	Nutritional disturbances
Chickenpox	Pertussis
Dehydration	Poisoning
Dietary deficiencies (pellagra, rickets, scurvy, tetany)	Rabies
	Scarlet fever
Diphtheria	Smallpox
Dysentery	Tetanus
Malaria	Tuberculosis
Malnutrition	Typhoid-paratyphoid fever

* Representing 30 per cent of the total pediatric deaths.

Impetigo Neonatorum.—This disorder is rare if, after the excess blood is wiped off at birth, the skin, except that of the buttocks, is not cleaned again for nine days, i. e. if the vernix caseosa is left intact. The use of various antiseptic oils and the application of 1 per cent copper oleate or 2 per cent ammoniated mercury also are efficacious.[13]

Syphilis of the Newborn.—Syphilis neonatorum can be eliminated if every pregnant woman has a Wassermann, Kahn or Laughlen test as early as possible in pregnancy. If it is negative and the symptoms or the history suggests syphilis, the test should be repeated. If the Wassermann test is positive, it also should be repeated as false positive as well as false negative reactions occur. Antisyphilitic treatment should be started as soon as a diagnosis of syphilis is made by a Wassermann test or the history, preferably before the fourth month of gestation; it should be continued throughout pregnancy and not stopped until serologic tests are persistently negative. A Wassermann, Kahn or Laughlen test[14] also should be made for every child who is examined for the first time, but treatment should not be started until the serologic evidence is conclusive or spirochetes are found by dark field examination. For every case of syphilis diagnosed clinically, at least five are discovered by routine serologic tests. Roentgenograms of the bones usually are diagnostic by the age of 2 months but should be confirmed by repeated Wassermann tests. Knowing the Wassermann reactions of the patient's parents is helpful but not diagnostic, as 20 per cent of syphilitic women are seronegative and 25 per cent of the children of syphilitic mothers are normal. If the child has syphilis, antisyphilitic treatment should be continued for at least seventy-five weeks.

POSTPARTUM MEASURES

The medical profession knows of the specific measures needed to prevent the conditions listed in table 3 but, as with antepartum care, the problem is to persuade parents to bring their children to the physician. Every physician who cares for children should practice, as a minimum, the procedures to be listed. An example of the accomplishments of postpartum preventive measures was reported by Brooks,[15] who stated that in Durham, N. C., the mortality of white infants fell from 83 to 57 per thousand births and that of Negro infants from 196 to 119 during the first four years of the operation of well baby clinics.

Periodic Examinations.—Infant mortality also can be reduced if every infant is carefully and completely examined by a family physician or pediatrician immediately after birth and at intervals of one month during the first half of the first year, of two months during the second half, of four months during the second year, of six months from the third to the sixth year and annually between the ages of 6 years and puberty. After the age of 2 years every child should be seen at least twice a year by a dentist. Annually from the age of 6 years, or earlier if necessary, children's vision should be tested by having them read test figures at a distance of 20 feet; children with visual defects should be examined and treated by a competent ophthalmologist. Deafness should be investigated by an otolaryngologist. The summer round-ups of children advocated by parent-teacher associations and health departments have been very beneficial.[16] Summer camps and Boy and Girl Scout activities also have greatly improved the health of children. It is just as true of children as it is of automobiles that checking at intervals and precautionary measures are more economical and more satisfactory than waiting until trouble requires repairs. If

11. Gengenbach.[8] Standards of Prenatal Care.[7]
12. Skeel, A. J.: Prevention of Gonorrheal Ophthalmia in the Newborn, J. A. M. A. **111**: 143-144 (July 19) 1938.
13. Swendson, J. J., and Lee, S. R.: Impetigo Contagiosa Neonatorum, J. A. M. A. **96**: 2081-2085 (June 20) 1931. Guy, W. H., and Jacob, F. M.: The Prophylaxis of Impetigo Neonatorum, J. A. M. A. **102**: 840-841 (March 17) 1934.
14. A positive Wassermann reaction of the cord blood or of the infant's blood during the first week of life and even up to the seventy-third day is evidence of syphilis in the mother but not necessarily in the infant (Fildes' law). The Wassermann reaction of the cord blood usually is the same as that of the infant's blood, but only half of the mothers who have positive blood Wassermann reactions have positive cord reactions. Of the children whose cord or early blood Wassermann reactions are positive, 17 per cent do not have syphilis; another test at the age of 2 weeks usually is less strongly positive, and the reaction becomes negative at the age of 3 months. If the child has syphilis, the positive Wassermann reaction and other evidence persist. In some syphilitic newborn infants the Wassermann reaction may be negative up to the age of 3 months; if the child's signs or the mother's Wassermann reaction or history suggests syphilis, the test should be repeated at the ages of 3 and 6 months. These reversals are more frequent in the offspring of treated mothers. After the age of 3 months, with very few exceptions, a persistently positive Wassermann reaction in a child indicates syphilis and a persistently negative reaction excludes the possibility.
15. Brooks, B. U.: A Study of Infant Mortality in the Southern States, South. M. J. **23**: 869-875 (Oct.) 1930.
16. The National Congress of Parents and Teachers: The Summer Round-Up of the Children, Washington, D. C., 1934.

it is profitable and economical to take a Chevrolet or a Ford costing $700 to a garage at intervals for inspection and adjustment, should not the public be educated by publicity [1] to take a child with a potential value of $10,000, according to some estimates, to a physician for periodic examinations?

Infant Feeding.—An infant should be breast fed for the first six months. Between the ages of 8 days and 3 years all children should be given daily from two to four teaspoonfuls of cod liver oil and from two to four tablespoonfuls of tomato or orange juice, or their equivalent substances. Diseases and deaths among breast fed infants are lower than among those artificially fed.[17] For weaning, evaporated (unsweetened) milk diluted with water and lactic acid and containing added sugar or Karo is digestible, safe and cheap. The use of lactic acid milk, because of its bactericidal action, has reduced the mortality from diarrhea and dysentery.[18] The home instructions for its preparations are simple.[19] The transition from breast or lactic acid milk feedings to a general diet should be made gradually from the fifth to the eighth month of age by adding one article of food at a time. For example, from one to four tablespoonfuls of cooked cereal should be fed once or twice daily before the bottle feedings at the age of 5 months, from one to four tablespoonfuls of finely chopped cooked meat or one egg daily at the sixth month, and so on, until by the age of 1 year the child is receiving a general well balanced diet. Every infant and child should be given as much fluid as possible, especially during hot weather. Because of their high salt content, bouillon cubes dissolved in a cup of hot water and then cooled should be given frequently during the summer.

Immunization.—At the age of 3 months infants should be vaccinated on the leg against smallpox. Reactions, complications and contaminations are less frequent at this early age. At the age of 4 months infants should be inoculated at weekly intervals with three doses of whooping cough vaccine. At the age of 9 months they should be protected against diphtheria with three doses of diphtheria toxoid or alum-precipitated toxoid at intervals of three weeks. Combined diphtheria and tetanus toxoid also is being used. Three months later, and also annually thereafter, Schick tests should be done. If they are positive, the toxoid injections should be repeated. Unless combined diphtheria and tetanus toxoid has been given, three injections of alum-precipitated tetanus toxoid at intervals of two months are recommended at the age of 1 year.[20] If the child has not been thus immunized, tetanus antitoxin should be administered if severe cuts or wounds occur. Tetanus neonatorum can be eliminated by clean obstetrics and midwife control.[21] Any one bitten by a mad dog, or one suspected of being mad, should receive the Pasteur treatment. If a child is exposed to measles, chickenpox or mumps, injections of blood from persons who have recovered from these diseases may be used. Immune globulin (human) also may modify measles. Children who live in districts in which scarlet fever is prevalent or severe can be protected against this disease if at the age of 1 year five doses of scarlet fever toxin are administered at weekly intervals and a Dick test is made two months later to determine the efficacy of the immunization. The Dick test should be repeated annually, as reimmunization may become necessary. At the age of 1 year children should be immunized with three injections of typhoid-paratyphoid vaccine at intervals of seven days. Typhoid and paratyphoid fever, though the death rate is decreasing in cities,[22] still are a menace because of automobile travel and the dispensing of cold drinks in open water-filled containers, which frequently are contaminated by the hands of customers and clerks, some of whom may be carriers.[23]

Deficiency Diseases.—In addition to those already cited, the other diseases listed in table 3 can be prevented. Malnutrition, nutritional and feeding disturbances, dehydration, anemia and the deficiency diseases (pellagra, rickets, scurvy, carious teeth and tetany) do not occur if the diet and amount of fluid are adequate.

Automobile Accidents.—Such occurrences are preventable, especially for children, who should be taught at home and at school to take precautions constantly.

Brucellosis (undulant or Malta fever).—This infection and other milk-borne diseases, e. g. tuberculosis, typhoid-paratyphoid A and B and streptococcic sore throat, often would be prevented by the rigid observance of the standard milk ordinance, the pasteurization of sweet milk and the use of whole lactic acid evaporated milk.[18]

The Spread of Dysentery and Summer Diarrhea.—This can be prevented by the following measures: the feeding of whole lactic acid evaporated milk mixtures to infants under 2 years of age; the pasteurization of sweet milk, butter and cheese fed to children; the thorough washing of the mother's or attendant's hands with soap and water every time she has been in contact with excreta of a person suffering from diarrhea of any form, or before she handles food for children; the keeping of excreta and soiled clothing of patients suffering from diarrhea in covered buckets containing soap pow-

17. Grulee, C. G.; Sanford, H. N.; Herron, P. H.; Schwartz, Harry, and Kantor-Amtman, Jennie: Breast and Artificially Fed Infants: A Study of the Morbidity and Mortality of Twenty Thousand Infants, J. A. M. A. **103:** 735-739 (Sept. 8) 1934, **104:** 1986-1988 (June 1) 1935; J. Pediat. **6:** 825-829 (June) 1935; Bull. Assoc. internat. de pédiat. prévent. **2:** 3, 1935.

18. Rothey, K. B.: Is the Benefit of Lactic Acid Milk in Infant Feeding Due to the Bactericidal Action of Lactic Acid? J. Pediat. **7:** 60-64 (July) 1935. Scheuer, L. A.: The Use of Lactic Acid Milk in the Prevention of Summer Diarrhea, J. Pediat. **7:** 468-471 (Oct.) 1935. Davison, W. C.: Elimination of Milk-Borne Disease, Am. J. Dis. Child. **49:** 72-78 (Jan.) 1935.

19. In the preparation of lactic acid evaporated milk, the contents of a 7 cent can of unsweetened evaporated milk (390 cc., or 13 ounces) are poured into a clean quart milk bottle previously scalded with boiling water, and the empty can is nearly filled with boiling water, in which then are dissolved one teaspoonful of lactic acid (U. S. P.) and three level tablespoonfuls of sugar. A soon as this solution is cold it is poured slowly into the quart milk bottle containing the unsweetened evaporated milk, while shaking the bottle constantly. Although not necessary, it is advisable, if the lactic acid is to accomplish its full bacterial effect, to keep the mixture six hours, preferably though not necessarily in a cold place, before it is fed in required amounts to the infant.[18] It should not be boiled or pasteurized, as it will curdle. Infants of any age can be fed 100 cc. (100 calories) of this mixture per kilogram of body weight (1½ ounces [45 calories] per pound) divided into from four to six feedings. If a child requires more than this amount (one can each of milk and water, a total of 780 cc., or 26 ounces) he also needs solid food. For premature, weak and very young infants, who occasionally vomit this formula, a small 5 cent can of unsweetened evaporated milk (160 cc., or 5⅓ ounces) may be added to two canfuls of water, one teaspoonful of lactic acid and two level tablespoonfuls of sugar; the mixture then contains 67 calories per hundred cubic centimeters or 20 calories per ounce, and 150 cc. per kilogram of body weight (2¼ ounces per pound) is required in twenty-four hours. A few infants thrive better on cultured whole lactic acid milk than on the evaporated variety.

20. McBryde, Angus: Tetanus Immunization with Alum-Precipitated Toxoid, South. M. J. **30:** 565-567 (June) 1937. Cooke, J. V.: Combined Active Immunization for Diphtheria and Tetanus: A Plea for Its Routine Use, ibid. **31:** 158-161 (Feb.) 1938. Jones, F. G., and Moss, J. M.: The Response of Human Subjects to an Injection of Tetanus Toxoid or Tetanus Alum-Precipitated Toxoid One Year After Immunization, J. Immunol. **33:** 183-190 (Sept.) 1937.

21. Bassett, V. H.: Prevention of Tetanus Neonatorum, Tr. South. Branch, Am. Pub. Health A., Nov. 30 and Dec. 1, 1937.

22. Typhoid in the Large Cities of the United States in 1937, J. A. M. A. **111:** 414-418 (July 30) 1938.

23. Report of the Committee on Immunization Procedures of the American Academy of Pediatrics, January 1938.

der and water until they can be boiled; the screening of houses, and the use of mosquito nets for the beds of children to prevent the access of flies.

Malaria.—This can be prevented by eliminating mosquitoes, by cleaning up and draining swamps, pools and collections of standing water and by screening houses and sleeping quarters.

Poisoning.—The sale of lye and other caustics without a prominent label should be prohibited by law.[24] All poisons should be plainly labeled and kept out of reach of children.

Poliomyclitis.—No benefit from vaccination has been proved, but during an epidemic children under 12 years of age should avoid crowds, swimming pools and indoor contacts with other children and especially with adults, many of whom may be carriers.[25] The crippling effects of the disease can be greatly reduced by adequate orthopedic care, which now is available under the crippled children's program supported by the United States Children's Bureau and state health departments.

Respiratory Infections.—The death rate directly or indirectly resulting from colds and respiratory infections is appallingly high. It is essential to remember that the cause of colds, which precede more severe infections, is exposure to an infected person. The inference is plain. The child should be protected from those who are suffering from colds by minimizing exposures and the use of canton flannel face masks. The system of allotting teachers to schools on the basis of pupil days instead of pupil enrolment increases the spread of respiratory infections because many teachers do not realize the risk in urging the attendance of children who have "just a slight cold." If these children were kept in bed at the onset of the illness recovery would be more rapid, contact cases would be avoided and the pupil days would be increased.[26] If the adenoids and tonsils are frequently infected, as indicated by recurring sore throats and enlarged cervical lymph nodes, they should be removed.

Tuberculosis.—Every one must be instructed not to expectorate or cough while near children or to kiss them. Any member of the family, servant, nurse or any other person who comes in contact with children should be carefully examined by x-rays for tuberculosis if such a person has a chronic cough, however mild. Tuberculosis in children can be prevented only if those who have the disease can be kept away. Women with active tuberculosis should not have children. Tuberculin tests should be made on every one. If negative, the test should be repeated annually. If positive, a physical and bacteriologic examination, and chest roentgenograms should be made so that those who have active or incipient infections may have adequate sanatorium or preventorium care. Contacts also should be examined to determine the source of the infection. Literature about this disease should be obtained from health departments and tuberculosis sanatoriums.

Mental Hygiene.—Last but not least, this is one of the most important phases of preventive pediatrics. Although not a factor in infant mortality, mental health problems, because of wrecked lives, often are as serious as those of physical health. Proper habit training, especially in eating and sleeping, child guidance and parental education[27] are essential. A harmonious home and a congenial environment also are necessary; juvenile delinquency is largely a product of the home. A disorderly emotional life must be recognized and corrected as early as possible. The school load should be reduced; the average child spends thirty hours a week in school and from ten to fifteen hours in additional home work. Kindergartens should be compulsory to accustom a child to companionship. The relationship of pediatrics to mental hygiene should be as close as possible.[28]

SUMMARY

The thirty-seven conditions which cause 56 per cent of the annual 240,000 deaths among American children can and will be prevented if the public is educated by publicity[1] to utilize the resources of the medical profession, which are already available in many communities and being established in others. Especially is this true of the measures for better antenatal and natal care.

The pediatrician must continue to lead in preventive measures and must also include mental hygiene and adolescent problems in his field.

School of Medicine, Duke University.

24. Martin, J. M., and Arena, J. M.: Lye Poisoning and Stricture of the Esophagus: Report of Fifty Cases, South. M. J. **32:** 286-290 (March) 1939.

25. Davison, W. C.: Poliomyelitis: A Résumé, Am. J. Dis. Child. **52:** 1158-1178 (Nov.) 1936.

26. London, A. H., Jr.: Personal communication to the author.

27. Child guidance is bettering the adjustment of children to their immediate environment, with special reference to their emotional and social relationships, to the end that they may be free to develop, to the limit of their individual capacities, to well balanced maturity. This function is exercised through the direct study and treatment of maladjusted children and the spread of the mental hygiene attitude throughout the agencies responsible for child care. Child guidance also helps the child by promoting parental understanding of and sympathy for his problems and by giving him, in the later years of childhood, a directive insight into his own behavior, thus affording a basis for the prevention of psychoses. Clinics for this purpose usually require pediatricians, psychiatrists, psychologists and social workers, but a family physician or pediatrician usually can, if as interested as he should be, produce satisfactory results. The child's past history, parents, socio-economic factors, home surroundings and school associations should be studied for emotional attitudes and evidence of adjustment and maladjustment. The child's confidence should be obtained and mental and performance tests made. Every maladjusted child has one or more problems and his behavior is an attempt to solve them. The physician's task is to learn the nature of these problems (such as fear of teachers or worry over unhappy homes) and by friendly explanation to help the child to meet them. Education of the parents in the training of children is, or should be, part of the pediatrician's duty. They should be taught to have a happy, healthy relation to the child, which will tend toward the development in him of such habits, patterns of conduct and mental attitudes that he will attain independence and normal control of his own emotions and habits. Bad habits often are developed by devoted but misguided mothers and grandparents who try to live the child's life for him. Infants should have caressing, loving care and the consistent, prompt response to their needs. However, rocking children to sleep, rubber pacifiers and evening amusements may be harmful. (Preston, M. I.: Child Guidance in Outpatient Pediatrics, J. Pediat. **7:** 452-464 [Oct.] 1935. Stevenson, G. S.: Child Guidance Clinics, New York, Commonwealth Fund, 1934. Richards, E. L.: Behavior Aspects of Child Conduct, New York, Macmillan Company, 1932. Kanner, Leo: Child Psychiatry, Springfield, Ill., Charles C. Thomas, Publisher, 1935. Jersild, A. T., and Markey, F. V.: Conflicts Between Preschool Children, New York, Teacher's College, 1935. McGraw, M. B.: Growth: A Study of Johnny and Jimmy, New York, D. Appleton-Century Company, Inc., 1935. Gesell, A. L., and Illg, F. L.: Feeding Behavior of Infants: A Pediatric Approach to the Mental Hygiene of Early Life, J. B. Lippincott Company, 1937. Aldrich, C. A., and Aldrich, M. M.: Babies Are Human Beings, New York, Macmillan Company, 1938). Adolescence is one of the greatest of pediatric problems, for children at puberty are subjected to physiologic, physical and psychic changes with marked exaggeration of sex impulses and emotions, and in addition they must adjust themselves to society by going from the period of parental control through a period influenced by emotions to adult life, which is or should be controlled by reason. Mental strain should be avoided and parents should not set intellectual goals which are too high for these children. Nine hours of sleep, one hour of mild outdoor exercise, a 4,000 calory diet for boys and a 3,000 calory diet for girls should be insisted on, and excitement and entertainments should be minimized. Overexercise and strenuous competitive athletics are harmful during this period. The family physician or pediatrician, if he can and will spend time and thought on the psychologic and social implications involved, should instruct the preadolescent child and his parents in sex development and the transition period and in a healthy normal attitude toward it.

28. Aldrich, C. A., and Veeder, B. S.: An Outline of the Pediatrist's Relation to Mental Hygiene, J. Pediat. **9:** 323 (Sept.) 1936; Am. J. Dis. Child. **52:** 1021-1026 (Oct.) 1936. Wolff, Ernst: Trends in Child Psychiatry, J. Pediat. **10:** 90-97 (Jan.) 1937. Friedjung, J. K.: Nervous Disturbances in School Children, Wien. klin. Wchnschr. **46:** 888 (July 14) 1933. Sullenger, T. E.: Juvenile Delinquency a Product of the Home, J. Crim. Law & Criminol. **24:** 1088, 1934. Gregory, M. S.: Psychiatry and the Problem of Delinquency, Am. J. Psychiat. **91:** 773 (Jan.) 1935. Richards, E. L.: Behavior Problems of the Pediatrician, M. Clin. North America **18:** 1663 (May) 1935. Wallace, Ramona: Relationship Between Emotional Tone of the Home and Adjustment Status, J. Juvenile Research **19:** 205 (Oct.) 1935. Dawson, W. S.: The Psychoses of Adolescence, Brit. M. J. **2:** 651 (Oct. 12) 1935. Plant, J. S.: A Psychiatrist's View of the Problem of Prevention in Pediatrics, South. M. J. **30:** 290 (March) 1937. Williams, J. F.: The Prevention of Nervous and Mental Disorders, M. J. Australia **1:** 387 (March 13), 419 (March 20) 1937. Casparis, Horton: Some of the Preventive Aspects of the Mental Health Problem, J. A. M. A. **106:** 2207-2209 (June 27) 1936.

KARAYA GUM (INDIAN GUM) HYPERSENSITIVITY

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To Dr. Stearns S. Bullen,[1] of Rochester, N. Y., belongs the credit of first calling attention to karaya gum as an allergen, in reporting a case of perennial hay fever from this substance. The patient was a woman, and the source of the karaya gum was the wave set material used on her hair. The following year Feinberg[2] reported a case of asthma due to karaya gum. Recently, through personal communication, I have learned of additional cases of sensitivity to the gum from Dr. Ralph Bowen, of Oklahoma City,[3] Dr. John Mitchell,[3] of Columbus, Ohio, and Dr. John Sheldon,[3] of Ann Arbor, Mich. To the reported cases, I here add sixteen cases from my own practice.

Attention is again called to karaya gum because of its widespread use in wave sets, the substance having almost supplanted flaxseed, quince seed, tragacanth and acacia for this purpose. The powdered gum may be obtained from any wholesale drug house and is comparatively cheap. Skin tests are readily performed by the scratch method using the moistened gum powder or a drop of any suspected wave set material. Intracutaneous test material can be made by dissolving a few granules of the gum in buffered saline solution and then sterilizing through a Seitz filter.

In addition to inhalation of karaya gum from the flaking of dried wave set material when the hair is combed, I sometime ago discovered that symptoms could be caused by ingestion. One of my patients with perennial hay fever reported a sharp attack of atopic coryza after eating a gelatin preparation which was found to contain the gum. A little later I asked her to swallow some of the gum mixed with food (mashed potato). Within a few moments after she swallowed a mouthful of the mixture there occurred a pronounced attack of atopic coryza and considerable epigastric discomfort. The patient was careful not to inhale any of the powdered gum. As will be related, several other patients have had definite symptoms from the ingestion of karaya gum.

Some of the known sources of contact with karaya gum are presented in table 1.

In the course of routine testing with karaya gum since Bullen's first publication, I have encountered sixteen instances of hypersensitivity to the gum, all in women. In seven cases no other reactors were given. The symptoms caused were perennial hay fever (atopic coryza), asthma, atopic dermatitis and gastrointestinal distress. All patients reacted strongly by scratch test: I have found no instances of reaction to intracutaneous test where the scratch test was not positive. Passive transfer tests gave definite positive reactions to karaya gum in the four cases in which they were attempted. The family history was positive for allergy in fourteen of the sixteen cases. A brief synopsis of the cases is presented in table 2.

Karaya gum as sold commercially is a fine white powder with an odor somewhat like that of acetic acid. It is entirely soluble in water, forming an adhesive mucilage more viscous than acacia. According to the twenty-second edition of the U. S. Dispensatory the name karaya, or Indian gum, has been applied to a number of substances, including Bassora gum, Sterculia gum and ghatti gum, which are derived from similar species of tropical trees. In India this gum is employed as a sizing agent in the calico printing industry.

In a recent article by Prof. A. C. Ivy[4] the following statement is made relative to the nature of the gum:

> Karaya gum is collected from the bark of a tree of the Astragalus species (Sterculiaceae). It is sometimes referred to as false or Indian tragacanth or Sterculia gum. It belongs to the general group of gums known as bassorin gums. However, complete information regarding the chemical and physical properties of karaya gum is not available in the literature. According to Pringsheim[5] the literature dealing with the gums and mucilages is very inaccurate and conflicting. Norman[6] states that no essential difference exists between gums and hemicelluloses; in both, hexose and pentose are linked with uronic acid. Solis-Cohen[7] gives arabin, bassorin and cerasin as the proximate principles of gums. Gums are chiefly pentosans. Many gums and vegetable mucilages, when dry, have the property of imbibing relatively large quantities of water. Porges,[8] using a mucilage of the bassorin type, found that it imbibed about three times more water than linseed or psyllium seed and five times as much as agar. Parsons[9] and Klecker[10] reported that the bassorin they used absorbs slightly more than two times more water than agar.

TABLE 1.—*Known Sources of Contact with Karaya Gum*

Gum drops and candies with soft centers, such as jelly beans
Kara jel
Fillers for ice creams; prepared ice cream powders
Certain brands of gelatin and junket
Many hand lotions
Hair-fixing (wave set) solutions
Many emulsified mineral oils and laxatives
Diabetic foods, including soy bean and almond wafers
Tooth pastes: (*A*) Listerine; (*B*) Lactona
Denture adhesive powders: (*A*) Dr. Wernet's powder; (*B*) Dent-a-firm; (*C*) Denture powder; (*D*) Stix
Fillers for lemon, custard and other factory made pies
Commercially prepared ices and flavor emulsions
Some salad dressings
Laxatives:
Karaba (Battle Creek Sanitarium)
Karabim (George A. Brown & Co.)
Saraka (Schering)
Mucara (John Wyeth)
Imbicoil (Upjohn)
Bassoran (Merrell)

The report on the analysis made for me of two samples of karaya gum is as follows:

Sample 1. 1 Gm. of gum contains 11.45 mg. of nitrogen, 8.45 mg. of nonprotein nitrogen, 3.0 mg. of protein nitrogen and 0.0019 mg. of protein.

Sample 2. 1 Gm. of gum contains 10.44 mg. of nitrogen, 7.21 mg. of nonprotein nitrogen, 3.23 mg. of protein nitrogen and 0.002 mg. of protein.

It thus appears that karaya gum contains approximately 0.1 per cent total nitrogen.

Recently several commercial firms have marketed laxatives with karaya or some similar gum of the

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1. Bullen, S. S.: Perennial Hay Fever from Indian Gum (Karaya Gum), J. Allergy **5**: 484 (July) 1934.
2. Feinberg, S. M.: Karaya Gum Asthma, J. A. M. A. **105**: 505 (Aug. 17) 1935.
3. Personal communication to the author.
4. Ivy, A. C., and Isaacs, Bertha L.: Karaya Gum as a Mechanical Laxative: An Experimental Study on Animals and Man, Am. J. Digest. Dis. **5**: 315 (July) 1938.
5. Pringsheim, Hans: Chemistry of the Monosaccharides and Polysaccharides, New York, McGraw-Hill Book Company, 1933.
6. Norman, A. G.: The Chemical Constitution of the Gums, Biochem. J. **23**: 524 (No. 3) 1929.
7. Solis-Cohen, Solomon, and Githens, T. S.: Pharmacotherapeutics, Materia Medica and Drug Action, New York, D. Appleton & Co., 1928.
8. Porges, M.: Treatment of Constipation with Normacol, M. J. & Rec. **128**: 89 (July 18) 1928.
9. Parsons, F. B.: Constipation and Mechanical Laxatives, Practitioner **129**: 70 (July) 1932.
10. Klecker, Ernst: Eine Methode zur Messung des Quellungsvermögens pharmakologisch verwendeter Quellstoffe, Arch. f. exper. Path. u. Pharmakol. **161**: 596 (Aug. 22) 1931.

bassorin type as the principal constituent. In the article by Ivy [4] this statement appears:

Karaya was administered in the form of granules under the trade name of "Mucara" to eighty-nine graduate and medical students, nurses and social workers (forty-six were female, forty-three were male). Each subject kept an accurate account of all food and fluids taken for seven days. This diet was then repeated on the same days of the following week with the addition of one heaping teaspoonful of Mucara taken once daily after the evening meal (9 Gm. Mucara equal approximately 7 Gm. karaya). . . . Seven, or 7.8 per cent, complained of some abdominal discomfort associated with distention shortly after taking Mucara. Three, or 3.4 per cent, complained of mild abdominal cramps while taking the Mucara.

Professor Ivy then went on to say that he was at a loss to account for the abdominal symptoms occasioned in these seven persons by the ingestion of the karaya gum. My own thought is that they were possibly mildly hypersensitive to the gum through having previously swallowed it as an ingredient of some food or confection.

I quote from Ivy's article to call attention to ingestion as a very prevalent means of contacting the bassorin gum—just as important a source as inhalation. In my series of sixteen, seven of the patients could attribute some or all of their symptoms to the frequent ingestion of the gum. Then too I wish to stress the widespread consequences of the indiscriminate use of these bassorin laxatives by unsuspecting allergic persons. The literature advertising Mucara states that "Mucara is a useful, harmless agent for the management of simple constipation," and yet three of the four patients of mine who were given karaya gum to swallow were made ill by it.

TABLE 2.—*Synopsis of Cases of Karaya Gum Sensitivity*

Case No.	Patient	Age, Yr.	Family History of Allergy	Source of Contact	Chief Symptoms	Results of Test	Other Reactors	Comment
1	Mrs. E. H. M.	31	Positive	Wave set, licorice, gum drops, listerine tooth paste	Perennial hay fever, eczema of ear lobes, asthma, chronic indigestion	Cutaneous ++++ Intracutaneous ++	June grass, English plantain, cottonseed	Nausea, epigastric pain and hiccough for 2 days after swallowing 2 teaspoonfuls of mucara
2	Miss L. M.	21	Negative	Agar-psylla? gum drops	Atopic dermatitis (generalized)	Cutaneous ++++ Intracutaneous +++ Passive transfer positive	None; foods ?	Nausea, vomiting, diarrhea, cramps and flare-up of dermatitis after swallowing 2 teaspoonfuls of bassorin
3	Mrs. C. A.	27	Positive	Wave set	Perennial hay fever, asthma	Cutaneous +++ Intracutaneous +++	Wheat, orris, flaxseed	Gum sensitivity not of major importance
4	Miss V. M.	18	Positive	Wave set	Atopic dermatitis (generalized)	Cutaneous ++++	Cereals, poliens, quince seed, cottonseed, kapok seed, flaxseed, silk	Gum sensitivity one of several factors
5	Mrs. G. C. W.	40	Positive	Wave set every week	Seasonal hay fever, perennial asthma	Cutaneous ++++	Ragweed, cat hair, house dust	Severe asthma from inhaling powdered karaya gum
6	Mrs. A. W.	36	Positive	Wave set	Asthma	Cutaneous ++++	Cat hair, shop dust	Asthma chiefly due to shop dust; polishes cutlery with flannel cloths
7	Mrs. L. D. L.	35	Positive	Wave set	Contact dermatitis, perennial hay fever	Cutaneous ++++ Intracutaneous ++	Positive patch test to fur dye	Patch test negative with karaya gum; atopic coryza from inhaling powdered gum
8	Mrs. H. C. D.	26	Positive	Wave sets, ice cream	Perennial hay fever, dermatitis of eyelids, face and arms	Cutaneous ++++ Intracutaneous ++++ Passive transfer positive Patch negative	None	Severe atopic coryza and abdominal cramps from ingestion of karaya gum
9	Mrs. C. Z.	23	Positive	Wave set, jelly beans, gum drops	Atopic dermatitis (generalized)	Cutaneous ++++ Intracutaneous ++++ Passive transfer positive	Cereals, pollens, silk, horse dander	Ate jelly beans frequently
10	Miss E. C.	34	Positive	Wave set material used in occupation	Perennial hay fever, dermatitis of eyelids, neck, arms	Cutaneous ++++	None	Beauty parlor operator
11	Miss M. D.	37	Positive	Wave sets, ice cream	Perennial hay fever	Cutaneous ++++	Ragweed, quince seed, horse dander	Karaya gum source of nonseasonal atopic coryza
12	Mrs. A. H.	22	Positive	Wave set	Perennial hay fever, dermatitis of eyelids	Cutaneous ++++ Intracutaneous ++	None	Violent sneezing and asthma from inhaling powdered gum
13	Mrs. C. C.	61	Positive	Gum drops	Dermatitis of eyelids and antecubital spaces	Cutaneous ++++	None	No recurrence of symptoms since avoiding gum drops
14	Mrs. J. F.	58	Positive	Wave sets	Seasonal and perennial hay fever	Cutaneous ++++	Ragweed	Symptom free through avoidance of gum contact
15	Mrs. W. L.	36	Negative	Wave set	Perennial hay fever	Cutaneous ++++	None	Symptom free through avoidance of gum contact
16	Mrs. G. J.	28	Positive	Gum drops, gelatin products	Dermatitis of hands, forearms and ears; rose fever	Cutaneous +++ Intracutaneous ++ Patch negative	House dust, horse dander, grass pollens	Formerly owned beauty parlor; no effect from swallowing bassorin; dust probably chief allergen

Karaya and related gums of the bassorin type are not harmless agents but may cause severe symptoms in the allergically susceptible by inhalation or ingestion.

SUMMARY

1. Sixteen cases, in addition to those before reported, of hypersensitivity to karaya gum were observed.

2. The chief presenting symptoms were perennial hay fever (atopic coryza), asthma, atopic dermatitis and gastrointestinal distress.

3. Ingestion, as well as inhalation, is a means of contacting the allergen.

4. The indiscriminate employment of karaya gum as a supposedly harmless laxative, especially for persons susceptible to allergic sensitization, should be avoided.

316 Michigan Street.

THE PROTHROMBIN IN THE BLOOD OF NEWBORN MATURE AND IMMATURE INFANTS

AS DETERMINED BY THE MICRO PROTHROMBIN TEST

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The recent phenomenal progress in the knowledge of the antihemorrhagic factor, called vitamin K by Dam and Schønheyder,[1] and its influence on the prothrombin activation of the blood have brought into clear relief the etiologic relationship in which this vitamin stands to the hitherto obscure bleeding tendency frequently encountered in the neonatal period. As early as 1912 Whipple,[2] after conducting coagulation experiments on the heart's blood obtained at autopsy from an infant dying of melena neonatorum, stated in no uncertain terms that the absence of prothrombin in the blood constituted the underlying cause of this disease. Simply because the blood used in Whipple's experiments was collected after death, this striking conclusion, published over a quarter of a century ago, apparently remained unheeded. Whipple, in the necropsy protocol, stated that the blood was quite fluid and that no evidence was found of any clot formation in any part of the vascular system. In retrospect it must be admitted that his conclusion, while based on observations of only two cases, was entirely logical and correct.

The more definite development of our knowledge further confirming the observation cited dates from 1929, when Henrik Dam,[3] in the course of biochemical investigations on sterol metabolism in chicks, first suspected the existence of vitamin K, since in the chicks on a fat-free diet hemorrhagic manifestations frequently developed. It was not, however, until satisfactory methods for quantitative estimation of prothrombin in the blood were evolved that the important role of this vitamin in the mechanism of blood coagulation began to be appreciated. In 1935 Quick, Stanley-Brown and Bancroft[4] improved the older Howell's method by using a suspension of thromboplastin in excess and then recalcifying the oxalated plasma. By this method Quick and Grossman[5] measured the prothrombin concentration of the blood in a few newborn babies and reported profound fluctuations occurring during the first forty-eight hours of life. Later Brinkhous, Smith and Warner,[6] in developing a two stage titration procedure, actually measured the prothrombin content of the plasma and observed that the prothrombin values of the twenty-one normal infants of varying ages were generally low throughout the first year of life, particularly those of newborn babies, ranging from 14 to 39 per cent of the level found in normal adult plasma. Owen, Hoffman, Ziffren and Smith,[7] using a simpler technic first developed by Quick,[8] demonstrated the same low level of prothrombin content in thirty-eight normal infants with a drop between the second and sixth days of postnatal life. Dam, Tage-Hansen and Plum[9] endeavored to account for hypoprothrombinemia in newborn infants on the basis of vitamin K deficiency due to a defective absorption of the vitamin from the gastrointestinal tract.

More recently Waddell, Guerry, Bray and Kelley,[10] in a published analysis of blood coagulation studies on two newborn infants having abnormally long prothrombin clotting time, reported the pronounced shortening of the clotting time following administration of vitamin K. Waddell and Guerry[11] further studied twenty newborn infants with special reference to the occurrence of unnatural bleeding. These infants were divided into two groups of ten each, one group serving as controls. The infants receiving no vitamin K therapy were found to show a prolonged prothrombin clotting time between the ages of 48 hours and 72 hours, whereas in those receiving the treatment the prothrombin clotting time was consistently shorter.

In this connection it is also of interest to know whether there exists any relation between the maternal and the fetal blood with respect to prothrombin concentration. As measured by the method of Warner, Brinkhous and Smith,[6] Hellman and Shettles[12] reported extremely low prothrombin levels in nineteen full term normal infants and nine premature infants, particularly in the latter, in sharp contrast to the normal complement of prothrombin found in their respective mothers. By administering vitamin K to some of these mothers prior to delivery they increased the plasma prothrombin from 68 to 130 per cent of control values. The normal full term babies born to these mothers also gave prothrombin levels almost three times as high as the average values found in other infants. Again, by giving vitamin K to two premature infants after birth they caused the plasma prothrombin to be elevated by the fifth day to from three to six times the initial values. Using the Quick technic, Norris and Rush[13] reported the prothrombin values of the maternal blood at delivery to be above normal (107 and 133 per cent for the undiluted and the 25 per cent diluted plasmas) and those of the babies' blood to be below normal (77 and 62 per cent for the undiluted and the 25 per cent diluted plasmas). On repeating the determinations from seven to fourteen days after delivery they noted a slight

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Dr. Maurice L. Blatt, chief pediatrician, the Premature Station, Cook County Hospital, and Dr. Frederick H. Falls, head of the Department of Obstetrics, Illinois Research and Educational Hospital, gave permission to use patients in their respective departments for these studies.

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increase in the prothrombin values in the babies' blood (89 and 82 per cent for the undiluted and the 25 per cent diluted plasmas), while no significant changes were observed in the mothers' blood.

The studies published, though few, clearly indicate the necessity of ascertaining the normal range of variations in the prothrombin concentration of a large number of both mature and immature infants. The chief obstacle in undertaking an investigation of any magnitude in newborn infants is the difficulty of applying prothrombin methods, which require relatively large amounts of venous blood. Venipuncture in small infants necessitates entering either the superior longitudinal sinus or one of the jugular (external and internal) veins, a procedure which, while perfectly harmless in the hands of experienced workers, nevertheless is not practical if the tests are to be performed at frequent intervals on the same infant. For this reason a new micro prothrombin method (Kato) was devised, following the general principle involved in Quick's original method [14] but using the whole capillary blood instead of venous plasma. Since this method requires only an amount of whole blood (from 10 to 15 cu. mm.) small enough to be easily obtainable from simple skin puncture, the prothrombin tests can be readily carried out several times a day on the same infant. This micro adaptation of Quick's method may be briefly described as follows:

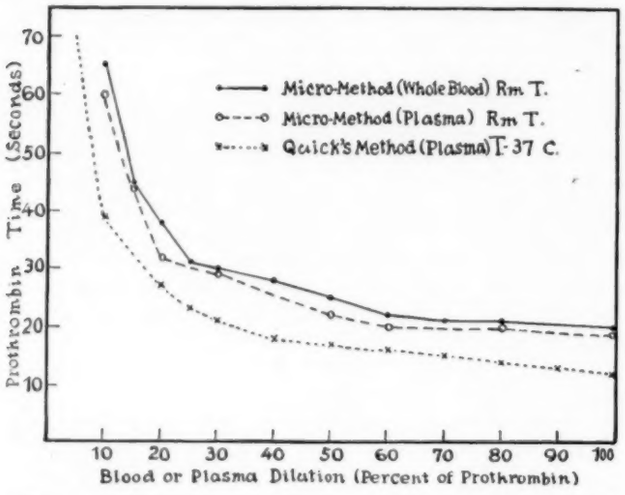
Micro-Method (Whole Blood) Rm T.
Micro-Method (Plasma) Rm T.
Quick's Method (Plasma) T 37 C.
Prothrombin Time (Seconds)
Blood or Plasma Dilution (Percent of Prothrombin)

Chart 1.—Prothrombin dilution curves, showing a close correlation between the curves obtained by micro prothrombin test and that published by Quick.

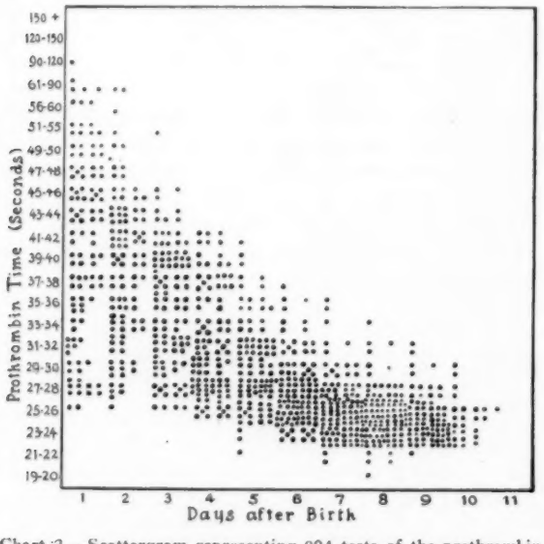

Chart 2.—Scattergram representing 894 tests of the prothrombin clotting time of 100 mature infants from birth to the eleventh day of life.

METHOD

Whole blood obtained from a deep skin puncture made on the heel of the infant and oxalated in the proportion of 1 : 500, using the double oxalate mixture in dry form as elsewhere described,[15] was used throughout the entire investigation. Ten cu. mm. of well mixed oxalated blood is measured out by means of a combination microhemopipet,[16] and the contents are expelled carefully either on a small watch glass or into the hollow of a test plate. A suspension of thromboplastin with a potency giving the prothrombin clotting time of about twenty seconds for normal adult blood is then added in the same amount, and this is followed immediately by the addition of the same quantity of 0.025 molar calcium chloride solution. After several seconds of thorough agitation of the ingredients by means of a fine glass rod, the prothrombin clotting time is determined with a stop watch, computation starting with the time when the last ingredient is added and ending with the fixation of the mass by fibrin formation. Since the test is carried out at average room temperature, all reagents used must also be kept at this temperature. If the reagents are used at refrigerator temperature or at any temperature below that prevailing in the room, the prothrombin clotting time will be materially prolonged. The potency of the thromboplastin suspension may vary from time to time, and hence it is advisable first to determine the prothrombin time of normal adult whole blood and then to use the value so obtained as the basal level. Since prothrombin clotting time is greatly influenced by the potency of thromboplastin, it is absolutely essential to prepare the suspension strictly in accordance with the instructions elsewhere given, using the brain of a freshly killed animal.

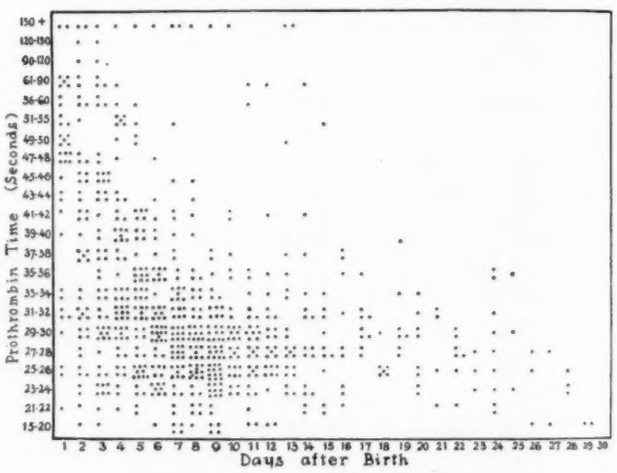

Chart 3.—Scattergram representing 701 tests of the prothrombin clotting time of seventy-three premature infants from birth to the twenty-ninth day of life. Note marked fluctuations in prothrombin time in this group.

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As determined by this method the prothrombin clotting time of normal adult capillary whole blood under optimal conditions is twenty seconds, with deviations of plus or minus two seconds. Since the test measures not the actual amount of prothrombin but rather the clotting time according to this particular coagulation

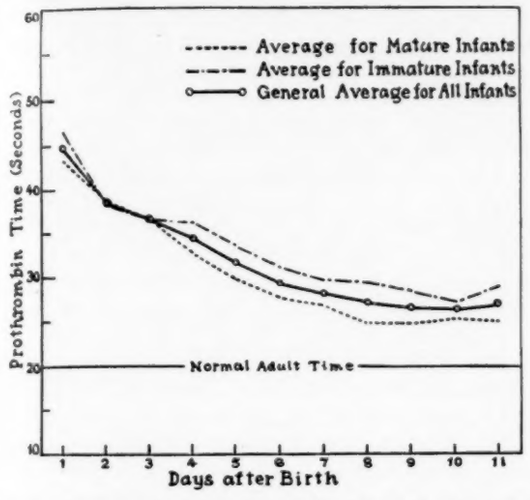

Chart 4.—Average values for prothrombin clotting time in mature and immature infants during the first eleven days of life. Cases with abnormally prolonged prothrombin time (over two minutes) have not been included in calculating these figures.

system, the "concentration" or "level" of prothrombin in the blood in the discussion of our data refers only to the results of computation based on the prothrombin dilution curve shown in chart 1.

Comparison of curves obtained by this method of using plasma prepared according to the method of Quick and oxalated whole blood reveals a satisfactory correlation of results. Because of the presence in it of blood cells which displace a corresponding proportion of plasma, whole blood naturally contains less prothrombin than plasma when the two are compared volume for volume. Thus it is reasonable to find the prothrombin time of plasma to be consistently shorter than that of whole blood. The clinical significance of the prothrombin time lies, however, not so much in the result of a single test, unless grossly abnormal, as in the trend of changes that ensue under various conditions. These curves also compare favorably with the prothrombin dilution curve reported by Quick,[17] in which the shorter prothrombin time results chiefly from the effect of the higher temperature (37 C.) at which his test is carried out.[18]

Recently some investigators [19] have found the optimal concentration of calcium chloride solution to produce the minimum prothrombin clotting time, by Quick's method, to be that of normal blood (0.0025 molar). But shortening of the time is disadvantageous in that the percentage of error becomes greater as the clotting time is shortened.

17. Quick, A. J.: The Nature of the Bleeding in Jaundice, J. A. M. A. **110**: 1658 (May 14) 1939.

18. Interpretation of results obtained by various methods may be facilitated if the data expressed in absolute number of seconds are converted into relative number (prothrombin index) by using the equation:

$$\frac{\text{Prothrombin time of unknown blood}}{\text{Prothrombin time of normal adult blood}} = \text{Prothrombin index}$$

Under normal conditions this index is always unity, and values greater than 1.0 have longer prothrombin clotting time (low prothrombin concentration) and those less than 1.0 shorter prothrombin clotting time (high prothrombin concentration).

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RESULTS AND COMMENT

The present investigation was undertaken to determine the normal limits of prothrombin clotting time in the neonatal period as tested by the micro prothrombin method just described. A total of 173 newborn infants form the basis of our study. An aggregate of 1,595 prothrombin tests were made in duplicate at frequent intervals beginning on the day of birth and continued for varying periods up to four weeks. Using the customary figure of 2,500 Gm. of body weight as the division line, the infants studied may be classified into two groups, according to the degree of maturity at birth. By this criterion 100 infants were mature and seventy-three immature. The data are presented in terms of the actual number of seconds required for the clot formation in the coagulation system recommended for the test. The prothrombin clotting time in the mature infants was studied up to the eleventh day of life (chart 2), while in the immature group the observations covered much longer periods, in a few cases extending up to the age of 4 weeks (chart 3). When these data are averaged for each date of postnatal life we obtain the general average range of prothrombin time of newborn infants during the periods here studied (chart 4). There appears to exist no correlation between the degree of infants' maturity and the prothrombin convertibility of the blood, at least on the first day of life (chart 5).

From the data presented it is at once evident that the prothrombin clotting time of the blood of newborn infants is for the most part high, particularly on the first day of life, showing an average of 46.5 seconds for the premature and 43.2 seconds for the mature infants. This prolonged prothrombin time gradually improves as the infants grow older, so that by the end of the ninth or tenth day it averages twenty-five seconds

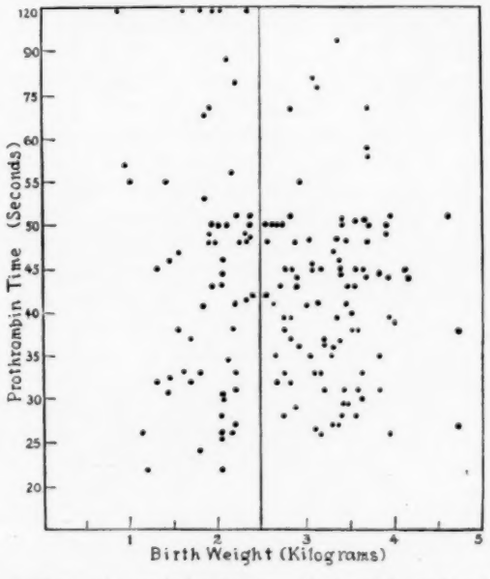

Chart 5.—Lack of correlation between birth weight and prothrombin clotting time.

in the full term, mature babies. In the premature group the same general rule holds, although among these infants there is a tendency for the prothrombin time to show much greater fluctuations than in the mature group. Also with many immature babies the prothrombin curve, instead of describing a gradual and uniform descent, frequently rises abruptly, pointing to

a lack of stability either in the prothrombin or in the prothrombin-antithrombin equilibrium. Some immature infants, on the other hand, may show unusually rapid activation of prothrombin in the blood, as evidenced by short clotting time even on the first day of life. Some typical examples of various prothrombin curves in individual babies are shown in chart 6.

The factors entering into the convertibility of the prothrombin are undoubtedly numerous. The most important single factor is probably the action of the antithrombin of the blood. Under normal conditions the antithrombin factor is physiologically balanced by the presence of proper amounts of thromboplastin. Also important in influencing the speed with which fibrin is formed are the quantity and reactivity of the fibrinogen. Likewise calcium undoubtedly plays a paramount role in blood coagulation. All these factors must be evaluated in order to interpret properly results such as have been presented.

The specific factors influencing the level of prothrombin in the blood are also of particular clinical significance. While the exact manner in which vitamin K acts on the concentration of prothrombin is not

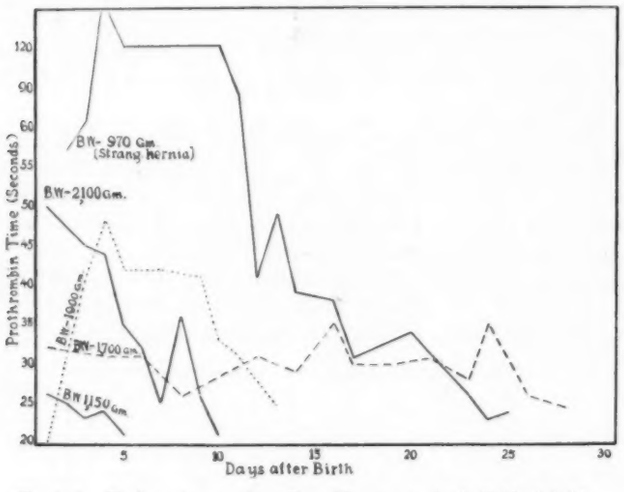

Chart 6.—Various types of prothrombin curves in individual babies.

clearly known, it is now generally agreed that intestinal absorption of this vitamin and normal functioning of the liver are the essential requirements for maintenance of a normal prothrombin level in the blood. Thus any pathologic changes produced either in the gastrointestinal tract or in the liver theoretically will, and actually do, diminish blood prothrombin, as evidenced by the fact that many types of liver diseases and intestinal disorders are often associated with a bleeding tendency. In one premature infant in our series showing prolongation of prothrombin time for many days, strangulated hernia developed. The hemorrhagic diathesis frequently developing in patients with obstructive jaundice has a slightly different pathogenesis in that the absence of bile in the intestine interferes with the normal absorption of antihemorrhagic vitamin.

Another possibly significant factor which may be responsible for the generally prolonged prothrombin time of the blood in the infants we have studied is the dietary habit of the mothers, a majority of whom came from families of the lower social strata. While no direct attempt was made to determine the possible vitamin K deficiency in the diet of these mothers, it is probable that this might have been an important factor influencing our data. Further studies on the prophylactic use of antihemorrhagic vitamin by pregnant women are in progress.

The most important clinical significance revealed by the present study is the fact that the average newborn infant possesses a smaller fraction of prothrombin complement than an adult. This explains in a most satisfactory way the exact pathogenesis of hemorrhagic disease of the newborn, clinically known as melena neonatorum, in which the chief manifestation is frank hemorrhage from the mucous membranes of the gastrointestinal tract, genito-urinary surfaces and umbilical cord. In many of the patients suffering from this disorder who came under our observation the blood prothrombin was usually demonstrated to be below 10 per cent of the normal adult complement, giving a greatly prolonged prothrombin clotting time or none at all. A detailed study of these cases will be published in a subsequent report. Again, in certain cases of intracranial hemorrhage occurring at birth it is very likely that trauma or difficult labor may play only a provocative role, the fundamental factor being a reduced prothrombin convertibility of the blood, a condition which naturally renders the patient susceptible to severe bleeding on the slightest provocation. Recently autopsy in a fatal case of intracranial hemorrhage disclosed an extensive extravasation in the posterior fossa; but a prothrombin test of the blood of this infant performed several hours before death showed complete failure of the coagulation system. This and other observations we have made emphasize the great importance and desirability of determining the prothrombin clotting time of every newborn infant; or, if this is not possible, adequate prophylactic measures should be instituted as a precaution before the infant is born. The micro prothrombin method used in the present study has been found to be entirely suitable for general and routine use, indicating that all subclinical cases of prothrombin deficiency can be recognized early and at once properly treated. Since it is not possible by antepartum examination of the maternal blood to detect which infants will have a prothrombin deficiency, the administration of vitamin K to the mother shortly before delivery is suggested.

SUMMARY AND CONCLUSIONS

The prothrombin clotting time of 173 newborn infants, both mature and immature, has been determined by the micro prothrombin method; an aggregate of 1,595 tests were made during the neonatal period, extending over four weeks of postnatal life.

The average prothrombin time of 100 mature infants on the first day of life was found to be 43.2 seconds; gradually shortening as the infants grew older, by the tenth day of life the average time was twenty-five seconds.

The average prothrombin time of seventy-three premature infants was 46.5 seconds on the day of birth and showed a much greater degree of fluctuation on subsequent days than that of mature babies. Also in this group were some infants whose prothrombin time actually increased after birth, and in one instance the prolonged prothrombin time of the blood was associated with strangulated hernia.

No correlation was found to exist between the degree of the infant's maturity and the prothrombin clotting time of the blood, at least on the day of birth.

The low prothrombin level of the blood in newborn infants satisfactorily explains the pathogenesis of

hemorrhagic disease of the newborn. This may be expressed clinically as hemorrhage into the gastrointestinal tract (melena, hematemesis) or bleeding from the cord (omphalorrhagia) or genito-urinary tract (hematuria). While in some cases of intracranial hemorrhage birth trauma was the precipitating factor, the severity of the bleeding was apparently induced by a lowering of the prothrombin level of the infant's blood.

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LIESEGANG AND MUSCLE PRESSURE WAVES

EFFECTS OF MICROCAPILLARITY ON MICROCOMPRESSIONAL WAVES OF PHYSIOCHEMICAL CHANGES CAUSING LIESEGANG AND MUSCLE STRIAE

EBEN J. CAREY, M.D.

MILWAUKEE

The structural significance of the cross striae and their relationship to the function of skeletal and cardiac muscles are unknown, even though the problem has been investigated for more than a hundred years. The factors resulting in the formation of periodic stratification in gels of concentric rings and spirals in agate and gelatin (Liesegang,[1] Hardy,[2] Ostwald[3] and many others) and the periodic bands in specially prepared gelatin in films and cylindric columns in test tubes (Hatschek,[4] Bradford,[5] Küster,[6] Hughes[7]) are still under investigation. Recently Raman and Subbaramiah[8] and others have presented evidence that the Liesegang phenomenon may be interpreted in terms of a wave effect. No experimental attempt heretofore has been made to study comparatively the microscopic striations produced in specially prepared gels in microcapillary glass tubules and the cross striae of muscle. Evidence is presented that there is an underlying physiochemical wave mechanics in the production of both Liesegang and muscle striae.

My objectives in this paper are (1) to demonstrate variable wave patterns and wavelengths expressed as striae that accompany different chemical changes in gelatin when the reactions are concentrated and transmitted within the lumen of a microcapillary glass tubule, (2) to compare these microscopic Liesegang striae with those found in striated muscle under controlled experimental conditions and (3) to suggest the significance of this concept of wave mechanics in the normal and abnormal motions of muscle, as previously suggested,[9] during the transformation of chemical into mechanical energy.

METHODS

Transverse and spiral Liesegang striations are generated by the simple method of confining from 4 to 10 per cent gelatin plus either 0.5 to 1 per cent sodium chloride, sodium iodide, sodium bromide or potassium bichromate within microcapillary glass tubules from one-half to 2 inches long, with an inside diameter of from 25 to 100 microns. The tubules are then placed in from 5 to 10 per cent silver nitrate for from fifteen minutes to twelve hours, mounted on microscopic slides by sealing the tips with melted paraffin. Evanescent striae, which last from thirty minutes to one hour, are produced when 10 per cent gelatin plus 2 per cent uric acid dissolved in 2 cc. of 0.1 per cent solution of sodium hydroxide are confined in microcapillary tubules to the ends of which is placed 10 per cent hydrochloric acid (fig. 3). Many other inorganic and organic chemical reactions are studied in a similar manner in more than 1,000 microcapillary glass tubules, including those of living amebas, in which a cross striated orientation of the living granules can be periodically demonstrated.

Living intact rectus abdominis muscles of the skinned frog (Rana pipiens) were stimulated by sudden elevation in temperature from 20 to 37 C. for ten seconds, then depression to 4 C. for fifteen minutes, and also by mechanical stretch, electrical and various chemical means. The animals are quickly frozen for six hours and then placed in 10 per cent formaldehyde U. S. P. for twenty-four hours; the muscles are excised, embedded in paraffin, serially sectioned, mounted on glass slides and stained with hemalum and eosin. Directly controlled observations of the changes within the intact living muscle fibers are made with the ultrapaque microscope and water immersion lenses.

Traveling overlapping peristaltic waves in both the intact intestine and the pregnant uterus with normal intact blood supply in the living guinea pig are converted into a standing system of pressure waves by tying ligatures from one-half to 1 inch apart prior to stimulation by any one of the following means: the direct application of 1 per cent pilocarpine, acetyl choline, barium chloride crystal, mechanical stretch or electrical stimuli. Multiple reflections of the intestinal waves between the two ligatures result in a standing system by constructive interference.

RESULTS

Liesegang striae from 0.5 to 35 microns apart (fig. 1 *A*) are found in the microcapillary glass tubules which contain silver iodide and from 4 to 60 microns in those with silver chloride (fig. 1 *D*). The striae are finer and closer together near the ends of the tubule, where the diffusing silver nitrate is higher in concentration and where the frequency of reversible mass action of chemical change is greater than that in the middle of the tubule between the two ends.

Striae in muscle fibers subjected to sudden rise in temperature to 37 C. (fig. 1 *B*) and those from mildly

Mr. Leo Massopust assisted with the photomicrographs.

From the Department of Anatomy, Marquette University School of Medicine.

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contracted muscle (fig. 1 *C*) at 15 C. are different in number in the fiber. Strongly contracted muscle has multiplication in the number of cross striations and rounded condensed nuclei (fig. 1 *B*) in contrast to those in the weakly contracted fiber. Reduction in the rate of chemical change by inducing hibernation through artificially cooling frogs and honey bees at 8 C. for from one to three weeks results in a progressive loss of cross striae in the muscle fiber. The muscle striae reappear when the temperature is raised to 20 C. within one to five hours. In irreversible strong muscle rigor the changes may be so great in parts of the muscle that the cytoplasm is arranged in homogeneous broad bands like Zenker's degeneration with the fine striae invisible. Phase amplitude and length differences in the underlying wave mechanics is microscopically detected by differences in the width and splitting of striae (figs. 1 *C* and 2 *B*). A vernier shifting effect of the muscle striae (fig. 1 *C*) and those striae of silver chloride (fig. 1 *D*) is evident. This may be due either to a spiral arrangement of striae or to a slight shifting of the wave front.

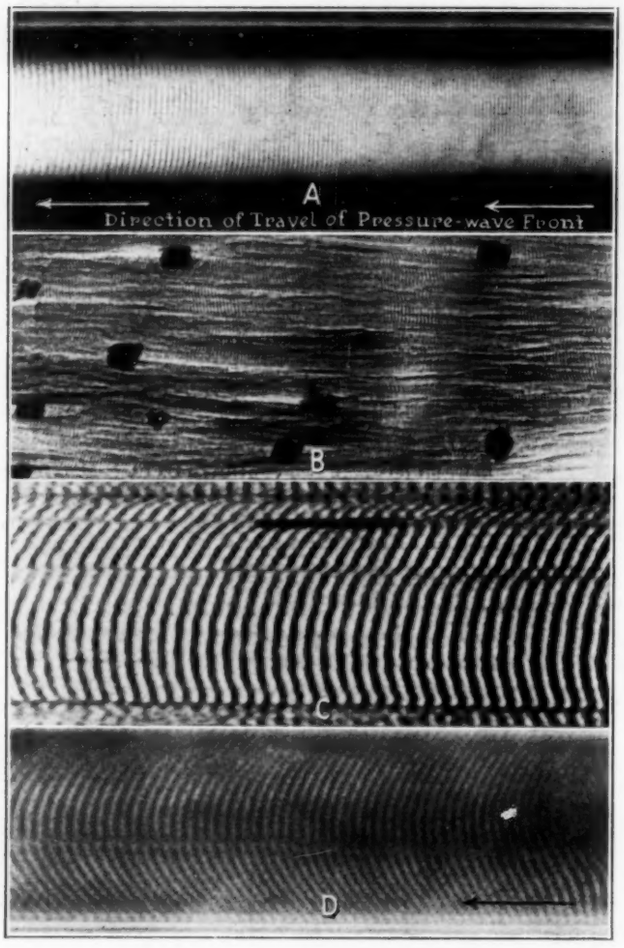


Fig. 1.—*A*, gelatin silver iodide striae within microcapillary glass tubule, inside diameter, 80 microns; reduced from a photomicrograph with a magnification of 260 diameters. *B*, strongly contracted muscle fiber, rectus abdominis of frog, compressed nuclei, fine striae with periodic beats of compact striae; original magnification 780. *C*, mildly contracted muscle fiber, rectus abdominis of frog, long nuclei, wide variable striae; original magnification 780. *D*, gelatin silver chloride striae within capillary glass tubule, inside diameter 80 microns; original magnification 260. Vernier shift of striae in *C* and *D*.

The spirality is the result of two simultaneous motions of the wave front: (1) translation and (2) rotation. Not all Liesegang and muscle striae, however, have a spiral arrangement.

A superpositional wave effect is detected (fig. 2 *A*) when silver iodide and chloride are produced simultaneously within the same microcapillary glass tubule. A fine dark band is frequently found in the middle of the light one (fig. 2 *A*), giving the effect observed at

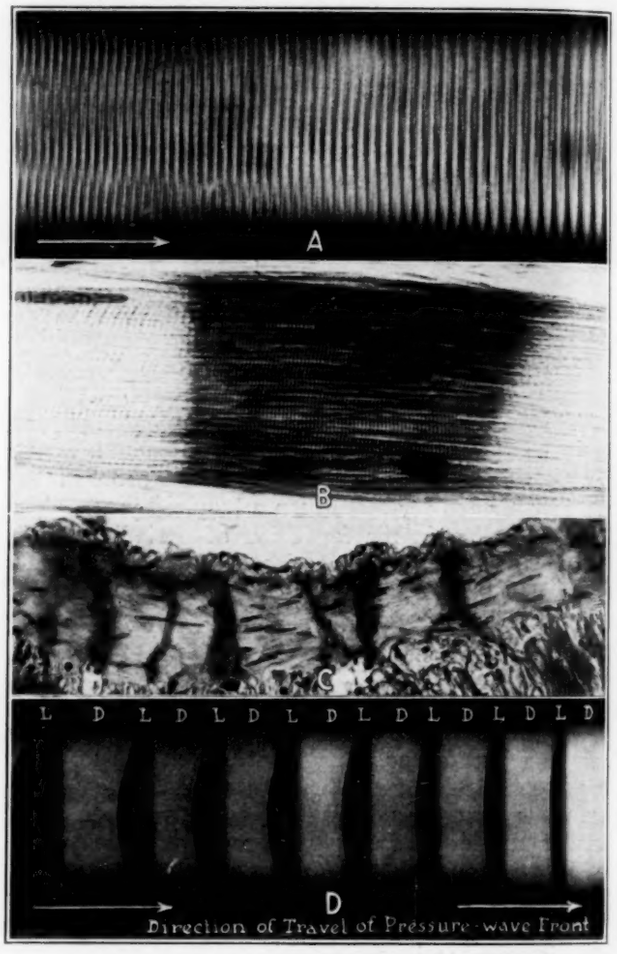


Fig. 2.—*A*, superposed gelatin silver iodide and chloride striae within capillary glass tubule, inside diameter 100 microns; original magnification 260. *B*, strong contraction waves with pressure nodes, fine striae, compressed nuclei; tension internodes, wide striae, long nuclei of rectus abdominis muscle fiber of frog; original magnification 910. *C*, compressed nodal, stretched internodal nuclei, long muscle layer, colon of guinea pig; original magnification 260. *D*, superposed gelatin silver iodide striae within capillary glass tubule, inside diameter 80 microns; original magnification 260.

times in muscle (fig. 2 *B*) of the alphabetical series of alternate dark and light Q, J, Z, J, Q bands. The intermediate Z band is inconstant in striated muscle. It is not a sine qua non of genuine cross striated muscle (compare figs. 1 *C* and 2 *B*). The Z band appears at a certain energetic level of the intrinsic wave mechanics of muscle.

Strong serial contraction compression waves in frog muscle may be generated by sudden direct changes of temperature resulting in alternate nodes and internodes (fig. 2 *B*). The pressure nodes have condensation of cytoplasm, fine closely spaced striae, increased anisotropy and mineral ash content and round compressed nuclei; the tension internodes have rarefied fibrillated cytoplasm, widely spaced striae, decreased anisotropy and mineral ash content and elongated nuclei. Strong serial standing compression waves in the smooth muscle of the intestine (fig. 2 *C*) and pregnant uterus of the living guinea pig are generated by stimulation of the muscle between ligatures placed 1 inch apart. Pressure

nodes and tension internodes in smooth muscle are similar to those in striated muscle as regards mineral content, anisotropy and nuclei. This histologic picture becomes clear when the traveling smooth muscle waves are transformed into those of a standing system by multiple reflections, producing constructive interference between the ligatures.

When a compressional wave front travels in the direction of the arrows (fig. 2 *D*) in a microcapillary glass tubule containing gelatin, sodium iodide and diffusing silver nitrate, there are generated superimposed intense waves. The widely spaced dark bands are generated by the photochemical action of carbon arc light for three seconds (the L's in figure 2 *D*); the finer intermediate striae develop during the two minute interval in the dark (the D's in figure 2 *D*). The progressive increase in the width of the dark bands with their convexities directed toward the left is due to the fact that those on the left are exposed to light over a longer period of time by the summation of the time intervals during exposure to light.

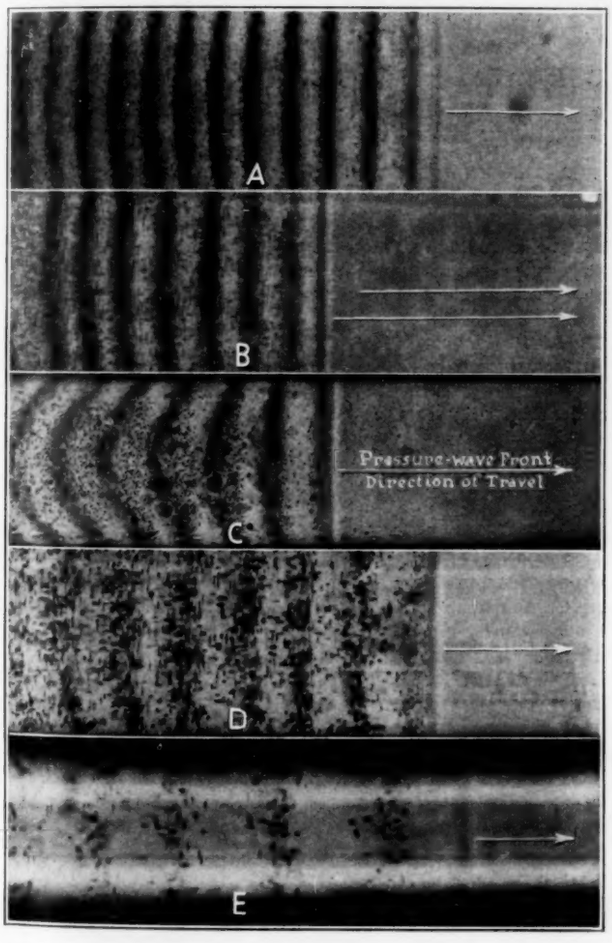


Fig. 3.—Same glass tubule containing gelatin, uric acid and diffusing hydrochloric acid (*A*) near end and (*E*) at middle of tubule. Progressive increase of wavelength with weakening of pressure wave front, identified as a transverse clear advent moving wave; original magnification 260.

The rate of travel of the mildly explosive pressure wave front (fig. 3) and the wavelength of the striae vary by changes of light, temperature, chemical concentration and constitution, colloidal state of the gelatin, length and diameter of the microcapillary glass tubules, and distance from the ends of the glass tubule. The interference pattern of the striae vary as centers of intense photochemical reactions occur in silver chloride gelatin within the glass tubules which produce biconcave, biconvex or crisscross arrangements (figs. 4 *B* and *C*). These pictures are similar to those of muscle striae underlying motor end plates (figs. 4 *D* and *E*).

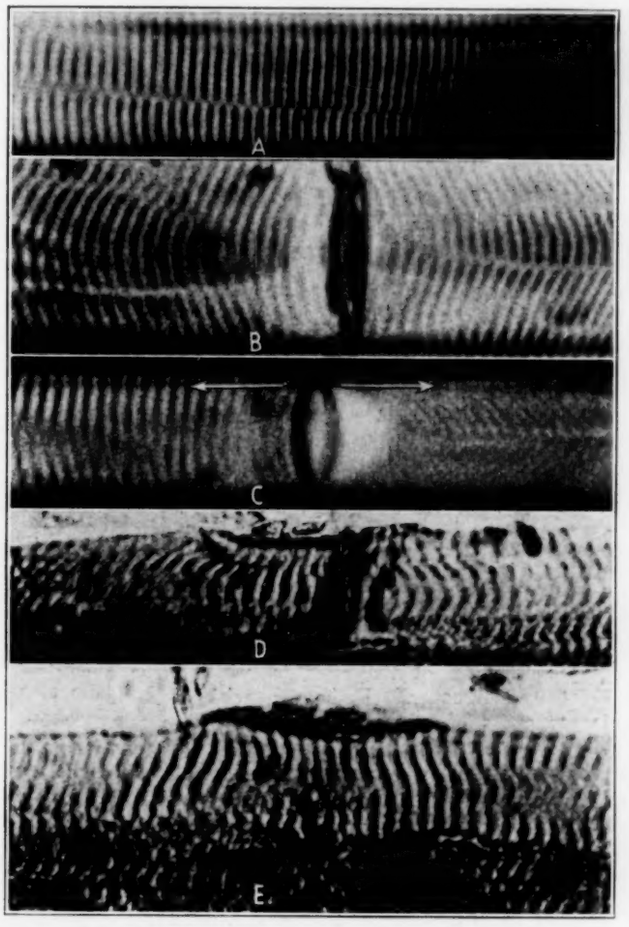


Fig. 4.—Gelatin silver chloride striae; *A*, vernier shift; *B* and *C* (original magnification 200), radiation of striae from center of photochemical change compared with similar radiation of muscle striae under motor end plates, intercostal muscle of white rat, *D* and *E* (original magnification 910), gold chloride technic.

SUMMARY

Microcapillarity confines, stabilizes, orients and concentrates the multiple microcompressional waves of physiochemical changes into alternate zones of condensation and rarefaction, expressed as both Liesegang and muscle striae. Wavelength, spacing of striae and rate of physiochemical change appear to be interrelated. Transformation of chemical into mechanical energy of muscle motion appears to be an algebraic summation of multiple micromechanical compressional waves of mildly explosive pressure, radiated from physiochemical reactions constrained within the microcapillary muscle fiber or fibril.

561 North Fifteenth Street.

The Boy.—Among the golden words of the English language are those in Captain Scott's farewell letter to his wife: "Make the boy interested in natural history if you can; it is better than games; they encourage it at some schools. I know you will keep him in the open air. Above all, he must guard and you must guard him against indolence. Make him a strenuous man." —Harris, H. A.: The Anatomical and Physiological Basis of Physical Training, *Brit. M. J.*, Nov. 11, 1939.

Clinical Notes, Suggestions and New Instruments

SULFANILAMIDE CYANOSIS RELIEVED BY NICOTINIC ACID

J. FRANK DOUGHTY, M.D., TRACY, CALIF.

Cyanosis occurring during the administration of sulfanilamide is so common that it is expected, but it has not been considered harmful. However, other symptoms which may be distressing are the frequent headache, weakness and nausea. In my limited experience, these symptoms are rarely present without the appearance of cyanosis.

In June 1939 I was administering sulfanilamide to a patient with facial erysipelas with excellent results in reducing the temperature and activity of the lesions; but severe cyanosis, headache, nausea and vomiting occurred. I recalled having read an abstract of an article reporting the relief of symptoms with sulfanilamide by giving nicotinic acid.[1] Therefore, I administered 20 mg. of nicotinic acid three times a day. The headache and nausea stopped and the cyanosis disappeared. It was possible to continue the sulfanilamide until the erysipelas was cured.

Since that time I have administered nicotinic acid to every patient receiving sulfanilamide who developed cyanosis or any of the other signs of toxicity to that drug. Complete relief of those symptoms usually occurred. These cases have included gonorrhea, streptococcic infection of the throat and of the hands, and one case of streptococcic pneumonia.

This report is made in the hope that it may give a clue to the mechanism of the cyanosis, which some physiologic chemist may discover. Perhaps a trial of the method in a larger series of cases may be of value to many patients having symptoms of toxicity accompanied by cyanosis due to the administration of sulfanilamide.

231 West Eleventh Street.

MODIFIED WESTERGREN SEDIMENTATION TUBE

H. D. FURNISS, M.D., NEW YORK

The sedimentation tube is a modification of the Westergren tube and was designed to improve and facilitate the technic of blood sedimentation.

The tube is 250 mm. long, with an internal diameter of approximately 2.5 mm. It is graduated from zero to 200 mm. and has a capacity in the graduated area of approximately 1 cc.

Two styles are available: one with stopcock permanently attached and the other without stopcock but with a metal plug to seal the top of the tube. A separate stopcock is available for the latter. The upper end of the stopcock has a Luer slip so that any syringe with a Luer tip can be attached. A Luer-Lok syringe is recommended because the tip is much stronger. The smaller the capacity of the syringe, the better the control.

TECHNIC

From 1.5 to 2 cc. of the blood is withdrawn into a test tube containing a suitable anticoagulant solution. Three satisfactory solutions are in common use:

1. A 20 per cent solution of potassium oxalate, one drop of this being used for each cubic centimeter of blood.

2. Heparin, containing 15 cat units per milligram, one drop being used for each cubic centimeter of blood.

3. Citrate, 0.25 cc. of a 3.8 per cent solution, added to 2.25 cc. of blood.

Blood is added to the preferred solution and the contents of the test tube are agitated gently until thoroughly mixed.

With the stopcock open and the syringe attached and in the closed position, the lower end of the tube is immersed in

Fig. 1.—Showing blood being drawn into the tube. When proper level is attained the stopcock is closed and the syringe removed.

the solution and the liquid aspirated to the zero mark. The stopcock is closed and the syringe detached.

The tube is then hung on the metal rack, which has previously been attached in a suitable place. The metal collar on the top of the tube is slotted to permit the tube to hang vertically and also prevents the tube from slipping down.

When the type with the detachable stopcock is being used, and in the event that it is desirable to use more than one tube, the bottom of the tube can be momentarily closed with the tip of the finger while the stopcock is being detached and the special metal plug, slightly moistened, is inserted in its place. If this method is used, it is suggested that the fluid level in the tube be raised slightly to compensate for the amount displaced when the metal plug is inserted into the top fitting of the tube. The finger may then be removed and the tube hung on the rack.

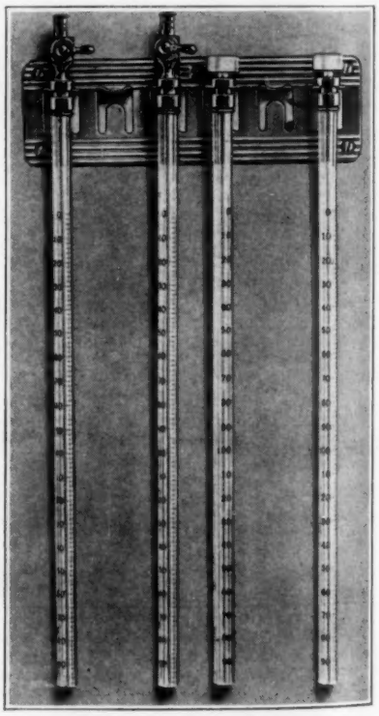


Fig. 2.—Tubes on the left have integrally attached stopcocks. The ones on the right are stoppered with a smoothly fitting plug that prevents leakage.

The glass tube can be sterilized by boiling or by the use of alcohol or the like. To avoid removing the lubricant, neither alcohol nor any grease solvent should come in contact with the stopcock.

54 East Sixty-Second Street.

1. McGinty, A. P.; Lewis, G. T., and Holtzclaw, M. R.: Symptoms Occurring with Sulfanilamide Relieved by Nicotinic Acid, Georgia M. A. J. **28**: 54 (Feb.) 1939; abstr. J. A. M. A. **112**: 1996 (May 13) 1939.

These tubes are manufactured by Becton, Dickinson & Co., Rutherford, N. J.

Special Article

THE PHARMACOPEIA AND THE PHYSICIAN

THE THERAPY OF DROPSY

H. M. MARVIN, M.D.
NEW HAVEN, CONN.

This is one of the second series of articles written by eminent authorities for the purpose of extending information concerning the official medicines. The twenty-four articles in this series have been planned and developed through the cooperation of the U. S. Pharmacopeial Committee of Revision and THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION.—ED.

Dropsy, or edema, is usually defined as the accumulation of serous fluid in the intercellular spaces of the subcutaneous or deeper tissues and in the serous cavities. The source of this fluid is the blood, from which it has escaped by passage through the walls of the blood vessels. Edema is always but one manifestation—although sometimes the most dramatic and important—of some abnormality or disease process, and its removal by medical means should logically begin with treatment of the causative process. Specific measures for its removal are necessary only if its location or extent render it harmful or uncomfortable to the patient and should ordinarily be employed only after correction or treatment of the underlying abnormality.

There are many conditions with which edema may be associated, but only a few of these will be considered in this review, which is concerned primarily with the practical aspects of medical treatment. The conditions to which attention will be devoted comprise congestive heart failure, acute and chronic nephritis, cirrhosis of the liver, the Pick syndrome of constrictive pericarditis, vitamin deficiency and marked lowering of the protein content of the blood plasma, whether this is found in malnutrition, in chronic glomerulonephritis or in so-called lipoid nephrosis.

For a clearer understanding of the discussion that follows, it is desirable to review briefly the mechanisms involved in the formation of edema. The opinion first expressed clearly by Starling [1] in 1896 has received the almost unanimous support of investigators in recent years; in its simplest form it may be stated as follows: The capillary wall is a membrane freely permeable to water and to most of the crystalloids of the blood, such as salt, sugar and urea, which pass from the capillary into the surrounding tissue spaces, or from these spaces into the capillary, in response to physical laws now well understood. The most important factor causing movement of fluid out of the capillary is the pressure exerted on it; in other words, the intracapillary blood pressure. If this were unopposed, most of the fluid of the blood would readily pass into the tissue spaces. But it is opposed, as Starling first showed, by a force due to the presence of proteins, chiefly albumin, in the blood plasma. These protein substances cannot pass readily through the capillary wall; by remaining within the lumen they attract fluid powerfully through the process of osmosis, the force so exerted being known as the colloid osmotic pressure of the plasma. Obviously the direction and extent of movement of fluid through the capillary wall must depend on the balance of these two opposed forces; if the intracapillary pressure is higher than the colloid osmotic pressure, fluid will pass out of the blood stream and edema will form. On the contrary, a rise in the colloid osmotic pressure above the capillary blood pressure will result in prompt withdrawal of fluid from the tissue spaces into the blood.

It is thought that both these processes are operating continuously in health and in disease. It is impossible to assign any constant value for the capillary blood pressure, since this varies in different parts of the body and in response to many influences, but in the capillaries at the base of the finger nail Landis [2] has found that the pressure at the arterial end of the loop averages about 43.5 cm. of water, while the colloid osmotic pressure is about 34 cm. of water. The result of this difference is to force fluid from the capillary. But when the blood reaches the venous end of the loop the pressure has fallen to an average value of 16.8 cm., while the colloid osmotic pressure has risen because of increased concentration due to loss of water. At the venous end of the capillary, then, fluid will be drawn from the tissue spaces into the blood. It is therefore clear that edema may result from either or both of two changes: an increase in the capillary pressure or a decrease in the amount of protein in the blood plasma.

This statement has been purposely simplified and abbreviated but is essentially correct. The mechanism that it describes is not the only one concerned in the formation of edema but is generally regarded as the most important. The other primary and contributory factors have been lucidly reviewed by Landis,[3] whose studies of the capillary circulation have added greatly to our knowledge. He regards as other primary factors injury to the capillary wall, which increases its permeability and obstruction to lymph channels. As contributory factors he mentions low tissue pressure, high salt intake, high fluid intake, a warm environment and disturbances of innervation. It is well to emphasize that the contributory factors may become of great importance and may actually determine the occurrence or disappearance of edema.

Thus in the capillary bed there are two important and opposed physiologic processes involved in the formation of edema; similarly in the kidney there are two fundamental and opposed processes involved in the formation of urine. It is now believed that the renal glomerulus acts essentially as a filter; relatively enormous quantities of a protein-free ultrafiltrate normally pass through it into the tubules, where most of it is reabsorbed, leaving only a small percentage to be excreted as urine. It is apparent that the volume of urine may be increased by either or both of two processes: an increase in glomerular filtration or a decrease in tubular reabsorption.

With this brief outline of the more important mechanisms in mind, we may consider the treatment of edema associated with various clinical conditions.

CONGESTIVE HEART FAILURE

Congestive heart failure is the most frequent cause of edema sufficient to require treatment; fortunately it is also the condition in which specific treatment is most gratifying. The edema is thought to be due to several

From the Department of Internal Medicine, Yale University School of Medicine, and the New Haven Hospital.

1. Starling, E. H.: On the Absorption of Fluids from the Connective Tissue Spaces, J. Physiol. **19**: 312, 1895-1896.

2. Landis, E. M.: Micro-Injection Studies of Capillary Blood Pressure in Human Skin, Heart **15**: 209 (May) 1930; Capillary Pressure and Capillary Permeability, Physiol. Rev. **14**: 404 (July) 1934.

3. Landis, E. M.: The Passage of Fluid Through the Capillary Wall, Am. J. M. Sc. **193**: 297 (March) 1937.

factors, which probably vary in relative importance in different cases. The effective filtration pressure in the capillaries is increased by the rise in general venous pressure that occurs in congestive heart failure and also by the muscular inactivity that generally accompanies it.[4] In addition there is increased permeability of the capillaries to water and crystalloids, and in some cases there is a fall in the effective colloid osmotic pressure of the plasma because some protein passes into the tissue spaces. The hypoproteinemia is probably increased at times by the loss of albumin in the urine and by the low protein diet often prescribed by the physician.

A detailed discussion of the treatment of congestive heart failure is beyond the scope of this article, but it is now generally agreed that this should include complete rest in bed, necessary sedatives, limitation of fluid and of salt intake, and full digitalization. These measures should precede the use of diuretics in most instances, since they will often result in marked diuresis and render further treatment unnecessary. But there are several important exceptions to this statement. If there is considerable fluid in one or both pleural cavities it should be withdrawn at once by means of paracentesis, for such fluid often causes great respiratory discomfort and is but slowly absorbed and excreted, even when diuretics are employed. Furthermore, if the edema elsewhere is so extreme as to be the cause of danger or grave discomfort, the mercurial diuretics should be administered at once, without waiting for the effect of digitalis. I am in agreement with Thomson [5] that the diuretic effect of these agents is often just as great without digitalis as with it, and the patient may be spared some days of discomfort if they are used immediately.

Xanthines.—Until about fifteen years ago the xanthine diuretics, sometimes known as the purine bases, were the only ones in general use. For practical clinical purposes this group may be regarded as consisting of theophylline and theobromine with their derivatives; caffeine is also a member but has little or no value as a diuretic in disease states. Theophylline may be administered in gelatin capsules containing from 3 to 5 grains (0.2 to 0.325 Gm.) and may be given two or three times a day. Even in this small dosage, however, it often causes nausea and vomiting after four or five doses have been given and must then be discontinued. Because of the likelihood of vomiting, it is usually wise to give theophylline for periods of only a few days at a time, even if it is well tolerated; there is some evidence that the total diuretic effect is greater with intermittent than with continuous administration. It is the most potent of the xanthine diuretics but can seldom be given in effective dosage because of its unfortunate side actions. In recent years it has been used far more frequently in combination with other salts, the best known preparations being theophylline with sodium acetate and theophylline with ethylenediamine (aminophylline). These are usually tolerated better than is theophylline alone and can therefore be used for longer periods, but it is well to omit them for a few days after a period of brisk diuresis. Theophylline with sodium acetate is available in tablets containing from 2½ to 7½ grains (0.16 to 0.5 Gm.); those which have an enteric coating are better tolerated by most patients. The therapeutic dose should be determined in each case by actual trial, starting with small amounts in order to avoid the induction of vomiting. Total daily quantities of from 15 to 30 grains (1 to 2 Gm.) can be taken by many subjects without discomfort if given in three or four doses, but amounts less than this often cause satisfactory diuresis. The other preparation, theophylline with ethylene diamine, is better known today because of its widespread use in recent years for its supposed effect on the coronary arteries. It is not a potent diuretic but may be of value in preventing the reaccumulation of edema that has been successfully removed by other agents. It is marketed in tablets containing 1½ grains (0.1 Gm.), and six or eight of these a day are required in most cases for any significant diuretic effect. Like other theophylline preparations, this also may cause nausea if given in doses sufficiently large to increase the volume of urine.

The Council on Pharmacy and Chemistry makes the following statement concerning the actions and uses of xanthine derivatives:

Actions and Uses.—The Council recognizes no therapeutic claim for any xanthine derivative beyond those for diuretic action and for use as a myocardial stimulant. Theobromine and theophylline surpass caffeine in their diuretic, and perhaps in cardiac and muscular, actions. They are therefore generally preferred in cardiac edemas, etc., since they are equally, or more, effective, more prompt and largely avoid the unpleasant side effects (insomnia, nervousness, gastric disturbance) which often interfere with the use of caffeine in adequate doses. This freedom from side effects holds true, particularly for theobromine. Theophylline surpasses theobromine in diuretic efficacy, but its action is probably not so lasting; it may produce gastric disturbances; renal irritation has been reported. Theobromine is therefore generally preferred, sometimes preceded for a few days by theophylline. If central stimulation is desired, caffeine must be used.

It has been the experience of almost all observers that theobromine and its compounds are less powerful diuretics than the closely related substances just named, but they are often well tolerated in effective dosage and may therefore prove to be far more satisfactory. Theobromine may be administered in capsules in doses of 5 or 10 grains (0.325 or 0.650 Gm.) three times a day and continued for a number of days if nausea does not occur. One of its best known compounds is theobromine with sodium salicylate, which contains approximately 50 per cent theobromine. This is one of the mildest of all diuretics, seldom causes nausea or vomiting and must be given in doses of from 40 to 60 grains (2.6 to 4 Gm.) or more a day. Another preparation is theobromine calcium salicylate, or theocalcin, which is said to contain 48 per cent theobromine, 11 per cent calcium and 38 per cent salicylic acid. Stewart's [6] study indicated its advantages, and these have been confirmed by subsequent experience. It is a potent diuretic, often superior to theophylline in this respect, seldom causes nausea and may be continued without intermission as long as diuresis results. It is available in tablets containing 7½ grains (0.5 Gm.), and the usual effective dose is from three to six tablets a day; larger amounts may be given if necessary.

It is the belief of many students that the xanthines cause diuresis by an action on the renal glomerulus, increasing the filtration, but authoritative opinion is not agreed on this. Smith [7] states that, although they increase the filtration rate, this is not an essential factor

4. Smirk, F. H.: Observations on the Causes of Edema in Congestive Heart Failure, Clin. Sc. **2**: 317 (Dec.) 1936.
5. Thomson, W. A. R.: The Organic Mercurial Diuretics in the Treatment of Cardiac Edema, Quart. J. Med. **6**: 321 (July) 1937.
6. Stewart, H. J.: The Use of Theocalcin in the Treatment of Heart Failure of the Congestive Type, J. Clin. Investigation **8**: 389 (April) 1930.
7. Smith, H. W.: The Physiology of the Kidney, New York, Oxford University Press, 1937, p. 238.

in their diuretic action, which is to be attributed to diminished reabsorption of water in the tubules. A final statement on this point is not possible as yet. The xanthines as a group are far from negligible; in recent years they have been overshadowed and to a large extent superseded by the mercurials, but they have an important place in the treatment of patients with slight or moderate edema and of those patients who object seriously to intravenous injections.

Organic Mercurials.—The mercurial diuretics are unquestionably the most effective available today, even though an occasional patient may exhibit a greater response to one of the xanthines. Merbaphen, the first to be introduced, has been almost completely displaced in recent years by salyrgan, which is regarded as more potent and less toxic. These are organic mercurial compounds containing about 10 per cent of mercury and are effective when administered by intravenous or intramuscular injection or in the form of rectal suppositories. Their effectiveness is greatly increased if acid-producing salts are administered by mouth for several days preceding the injection, and this preliminary medication should be a routine unless the need for the first injection is urgent. Ammonium chloride and ammonium nitrate are the salts most commonly used, but calcium chloride and calcium nitrate are also effective. It has been shown [8] that there is a true synergism between these salts and the mercurial preparation; all four regularly cause a lowering of the carbon dioxide combining power of the plasma and increase the diuretic response. Alkalizing salts cause a rise in the carbon dioxide combining power and a decrease in the diuretic effect, while neutral salts cause no change in either function. The statement is often made that doses of these acid-producing salts as large as from 90 to 120 grains (6 to 8 Gm.) a day must be given in order to secure satisfactory results, but my experience is in accord with that of Thomson,[5] who has found doses of from 60 to 90 grains (4 to 6 Gm.) quite sufficient. Even these smaller doses will almost invariably cause nausea and vomiting unless administered in the form of enteric coated tablets, which are taken by most patients without discomfort in the doses mentioned.

The mercurials for injection are available in ampules containing 1 and 2 cc. It is customary to give only from 0.5 to 0.75 cc. at the first injection, in case there should be an idiosyncrasy to mercury or some untoward reaction, both of which are rare. Subsequent doses are usually 2 cc. If the patient requires a series of injections it is satisfactory to continue ammonium chloride without interruption and inject the mercurial every third, fourth or fifth day. The results are almost always satisfactory and sometimes astonishing; it is not unusual to secure a urinary secretion of from 6 to 10 liters in twenty-four hours, and quantities as large as 15 or 16 liters have been recorded.

A few years ago Shelling and Tarr [9] reported that the diuretic effect of salyrgan might be increased by combining magnesium sulfate with it. They recommended the use of 15 cc. of 50 per cent magnesium sulfate with 2 cc. of salyrgan and 1.5 cc. of 5 per cent procaine hydrochloride, the whole to be mixed thoroughly in a 20 cc. syringe and injected deeply into the gluteal muscles. There can be no question that this combination is sometimes remarkably efficacious with patients who have shown little or no response to salyrgan alone. To secure such effects, however, it is not always necessary to use such large quantities of magnesium sulfate; a mixture of 2 cc. of salyrgan, 6 or 8 cc. of 50 per cent magnesium sulfate and 2 cc. of 1 per cent procaine hydrochloride solution has often given excellent results. This is about half the total quantity recommended by Shelling and Tarr, and its injection into the muscles seldom causes pain at the time or later. It should be added that the anterior muscles of the thighs are more suitable for such injections than are the gluteal muscles if the patient is confined to bed.

It is generally agreed that the mercurial diuretics owe their effect largely, if not exclusively, to a direct action on the renal tubules, diminishing their power of reabsorption.

Since there was a widespread belief that the xanthines caused diuresis chiefly by increasing glomerular filtration and the mercurials by diminishing tubular reabsorption, it was but natural that attempts should be made to secure a more effective diuretic agent by combining the two substances. In Europe such a combination was introduced as early as 1929; several years later it appeared in this country under the name mercupurin. According to the revised supplement to New and Nonofficial Remedies 1939, it contains 10 per cent of the mercurial component and 4.86 per cent of anhydrous theophylline; each cubic centimeter contains about 39 mg. of mercury in nonionizable form. DeGraff and his collaborators [10] in a series of important studies have shown that the addition of theophylline to a mercurial diuretic causes much more rapid absorption from the site of intramuscular injection and also renders it far less injurious to the tissues. Comparative clinical studies have shown that the combination of the two substances is a more potent diuretic than is the mercurial alone, and this increased potency is apparently due entirely to the addition of theophylline. The advantages of combining the two have been so apparent in recent years that practically all mercurials now marketed in Europe have been modified by the addition of 5 per cent theophylline. Several years ago salyrgan was thus modified and is available under the name salyrgan-theophylline; apparently its content of mercury and of theophylline is approximately the same as that of mercupurin. More recently there has been introduced a combination of the two under the name esidrone, which is said to contain 31.2 per cent mercury in nonionizable form and 28 per cent theophylline, which is chemically connected with the mercury molecule. The reports on its clinical use thus far available [11]

8. Ethridge, C. B.; Myers, D. W., and Fulton, M. N.: Modifying Effect of Various Inorganic Salts on the Diuretic Action of Salyrgan, Arch. Int. Med. **57**: 714 (April) 1936.

9. Shelling, D. H., and Tarr, Leonard: The Combined Use of Magnesium Sulfate and Salyrgan as a Diuretic in Cardiac Edema, M. J. & Rec. **131**: 365 (April 2) 1930.

10. DeGraff, A. C., and Batterman, R. C.: Reaction at Site of Injection of Mercurial Diuretics as Influenced by Theophylline, Proc. Soc. Exper. Biol. & Med. **32**: 1546 (June) 1935. DeGraff, A. C.; Nadler, J. E., and Batterman, R. C.: A Study of the Diuretic Effect of Mercupurin in Man, Am. J. M. Sc. **191**: 526 (April) 1936. DeGraff, A. C.; Batterman, R. C., and Lehman, R. A.: The Influence of Theophylline upon the Absorption of Mercupurin and Salyrgan from the Site of Intramuscular Injection, J. Pharmacol. & Exper. Therap. **62**: 26 (Jan.) 1938. Lehman, R. A., and Dater, Arnold: Further Studies on the Absorption of Mercurial Diuretics as Influenced by Theophylline and Other Substances, ibid. **63**: 443 (Aug.) 1938. DeGraff, A. C.; Batterman, R. C.; Lehman, R. A., and Yasuna, E.: Excretion of Mercury Following Administration of Mercurial Diuretics With and Without Theophylline, Proc. Soc. Exper. Biol. & Med. **39**: 250 (Nov.) 1938.

11. Uhlmann, F.: Ueber ein neues Diureticum, Esidron, Klin. Wchnschr. **17**: 352 (March 5) 1938. Hartmann, Max, and Panizzon, Leandro: Zur Kenntnis der Quecksilberdiurese und über Esidron, ein neues Diureticum, Arch. f. exper. Path. u. Pharmakol. **188**: 554, 1938. Schneiderbaur, A.: Ueber Quecksilber-Diurese mit Esidron "Ciba," München. med. Wchnschr. **85**: 1783 (Nov. 18) 1938. Volini, I. F., and Levitt, R. O.: Studies on Mercurial Diuresis—Esidrone, a New Mercurial Diuretic, Illinois M. J. **74**: 355 (Oct.) 1938.

are not sufficient to determine whether the great increase in the amount of theophylline in the mixture has caused any considerable increase in its diuretic potency. [The product has not been accepted by the Council on Pharmacy and Chemistry.—ED.]

There can be no question that the combination of a mercurial with theophylline is the most powerful diuretic agent now available for most patients with congestive heart failure.

Both salyrgan and the mercurial component of mercupurin are available in the form of rectal suppositories, each containing approximately 0.5 Gm. of mercury and a small amount of local anesthetic to prevent rectal irritation. A cleansing enema usually precedes the insertion of the suppository, and the diuretic response is often increased by the preceding administration of the acid-producing salts. Some observers have found the suppositories to be almost as effective as intravenous or intramuscular injections of the mercurials, but most regard them as about one third to one half as effective. (It should be noted that the suppositories of salyrgan have recently been found to result in rectal irritation or ulceration in so many cases that their acceptance has been rescinded by the Council on Pharmacy and Chemistry, and many clinicians have discontinued their use.[12]) Similar unfortunate results have apparently not followed the use of mercurin suppositories, but any such preparation should be used with great caution and should be discontinued immediately on the appearance of signs of local irritation.

There is general agreement that the mercurials should not be used in the presence of acute nephritis or ulcerative colitis. For some years fear was expressed that they might cause serious injury to the renal tubules, and a few such instances have in fact been reported. But the accumulated experience of the past ten years justifies the statement that the mercurial diuretics, especially those combined with theophylline, are safe and highly effective and often retain their full potency after hundreds of injections over a period of many months or years. In the great majority of cases, even of chronic nephritis, there is no evidence that the kidneys have been injured by the mercury.

Potassium Salts.—According to Keith and Binger,[13] potassium salts were recommended for the treatment of dropsy as early as 1679. In recent years most of the studies relating to their diuretic action have been concerned with nephritic patients, but in 1932 Barker[14] reported excellent results from the administration of potassium chloride to a group of patients whose edema was due to congestive heart failure. He emphasized the importance of placing such patients on a full general diet with an excess of acid ash in which a low ratio of sodium to potassium is maintained. The dose of potassium chloride found to be effective in most of his cases was 5 Gm. (75 grains) a day; this amount was given to the patient each morning in a salt shaker and sprinkled on the food instead of sodium chloride. At the end of the day any salt remaining was dissolved in water and taken by mouth. Twelve of his sixteen patients obtained excellent results, and he observed, as others had done, that no ill effects followed even if very large doses were given for long periods.

In a later and more elaborate study, Keith and Binger[13] found that potassium salts gave "very satisfactory diuretic results" in 48 per cent of their sixty cases and fair results in another 33 per cent, but their figures do not indicate in how many of these edema was due to heart failure. After a careful study of five potassium salts they concluded that the nitrate was preferable, since it frequently caused diuresis and seldom gave rise to untoward effects. They pointed out that any potassium salt must be given in large doses, amounting to 12.5 Gm. or more of the nitrate a day, but state that smaller doses should be administered first. One of their patients took 24.5 Gm. of potassium salts daily for thirteen days and 871 Gm. in sixty-eight days without complaints or toxic symptoms! The salts may be administered in powder form or in solution, but the most satisfactory method is by means of enteric coated tablets containing 7½ grains (0.5 Gm.) each. Like ammonium chloride and ammonium nitrate, the potassium salts may be used in conjunction with other diuretics to enhance the action of the latter.

A great many studies are in complete harmony in indicating that in the experimental animal, in normal human subjects and in patients with edema due to several different causes the replacement of sodium by potassium results in increased excretion of water, while the substitution of sodium for potassium results in increased retention of water. The exact mechanism responsible for these results, however, is not entirely clear. It is known that potassium is quickly absorbed from the intestine and is promptly excreted by the kidney, which is able to concentrate it as much as fifty times; even after large doses the amount in the blood is seldom elevated appreciably and often not at all. In fact the careful measurements of Barker[14] revealed practically no changes in the sodium, potassium, calcium, carbon dioxide combining power, p_H, or cholesterol of the blood during the administration of potassium. In some cases it seems possible that the diuresis is linked with a shift in the acid-base equilibrium, but this cannot be demonstrated regularly.

Bismuth.—Ten years ago, Mehrtens and Hanzlik[15] brought forward evidence indicating that certain bismuth preparations injected intramuscularly in small doses act as a diuretic and are almost devoid of toxic manifestations. In the following year Hanzlik and his co-workers[16] cited case reports indicating that bismuth sodium tartrate injected in doses of one half grain (0.03 Gm.) often caused prompt diuresis which was maintained for from four to eighteen days, the average being six days. It was particularly satisfactory in cases of edema due to heart failure, and in the cases cited it was far more effective than merbaphen or theophylline with sodium acetate. Several years later Stockton[17] reported the results of intramuscular injections of bismuth sodium tartrate in thirteen cases of edema in which there had been no response to treatment with digitalis and the xanthine and mercurial diuretics. Congestive heart failure was present in nine of these. Bismuth sodium tartrate caused marked diuresis in ten cases and moderate diuresis in one; four showed no diuretic response either to this or to other agents. The average duration of diuresis after the injection of a bismuth preparation was four days.

12. DeGraff, A. C.; Cowett, M., and Batterman, R. C.: Rectal Irritation Following the Use of Mercurial Diuretics in Suppository Form, J. A. M. A. **113**: 214, (July 15) 1939. Salyrgan Suppositories and Mercurin: A Warning, Report of the Council on Pharmacy and Chemistry, J. A. M. A. **113**: 213 (July 15) 1939.
13. Keith, N. M., and Binger, M. W.: Diuretic Action of Potassium Salts, J. A. M. A. **105**: 1584 (Nov. 16) 1935.
14. Barker, M. H.: Edema as Influenced by a Low Ratio of Sodium to Potassium Intake, J. A. M. A. **98**: 2193 (June 18) 1932.
15. Mehrtens, H. G., and Hanzlik, P. J.: Bismuth as a Diuretic, J. A. M. A. **91**: 223 (July 28) 1928.
16. Hanzlik, P. J.; Bloomfield, A. L.; Stockton, A. B., and Wood, D. A.: Diuresis from Water Soluble Bismuth, J. A. M. A. **92**: 1413 (April 27) 1929.
17. Stockton, A. B.: Bismuth Diuresis and the Blood and Urinary Changes Under Clinical Conditions, Arch. Int. Med. **50**: 142 (July) 1932.

These reports are so encouraging that it is surprising not to encounter further reports in recent medical literature. Untoward actions or toxic effects cannot explain this apparent neglect, for these are absent or negligible; in fact, Hanzlik [18] states that the group of observers at Stanford University has used bismuth preparations in various ways in several thousand cases and in animals in the past twelve years without serious disturbances, injuries or fatalities. It seems probable that this drug, like others of undoubted merit, has failed to come into general use because the mercurial diuretics are usually more potent, even though their action is less sustained than that of bismuth.

According to Stockton,[19] bismuth sodium tartrate probably causes diuresis by general tissue action, resulting in mobilization of chlorides and water. He explains the effect of the mercurial diuretics and of theophylline in the same way, whereas most students today believe that these substances act directly on the kidney. A belief in general tissue action of diuretics was widespread ten years ago but has been largely abandoned in the light of recent studies.

Urea.—Although urea has been recommended as a diuretic in renal disease for a long time, its use for the treatment of cardiac edema seems to date from the report of Crawford and McIntosh [20] in 1923. They found it to be of great value in seven of eight cases in which edema was due to heart failure and recommended it both for the removal of edema and to prevent its recurrence. No toxic effects were observed. In 1932 Miller and Feldman [21] emphasized several of the cardinal virtues of this substance, demonstrating that its diuretic potency does not diminish during months or years of practically uninterrupted use, that there are no demonstrable deleterious effects on the kidneys or other tissues and that it acts, alone or in conjunction with other agents, as an admirable prophylactic to prevent the recurrence of edema.

Large doses are required, varying from 15 to 60 Gm. or more (225 to 900 grains) a day. It is administered most satisfactorily in ice cold aqueous solution three times a day immediately after meals. Its unpleasant taste, which is practically its only disadvantage, can be mitigated for some patients by dissolving it in syrups or fruit juices. Syrup of acacia has been especially recommended as a vehicle for urea, its colloidal nature serving to mask the urea quite satisfactorily. Urea is rapidly absorbed from the intestine and is practically devoid of action in the tissues, even in large doses. After it has been taken for a few days the blood nitrogen should be determined to ascertain whether it is being properly excreted. In almost all instances of congestive heart failure, and even of nephritis and nephrosis, it is readily excreted and carries with it large quantities of water. This mechanical diuretic action is thought to be enhanced by decreased reabsorption in the renal tubules.

Urea is an extremely valuable diuretic and deserves wider popularity than it seems to enjoy at present. All available clinical reports emphasize its complete freedom from untoward actions and its extraordinary constancy of diuretic effect. While it is usually less dramatic in its immediate results than are the mercurials, it has obvious advantages and may be used to supplement the latter. There are but few patients who cannot take it for at least several weeks at a time, and many continue it for months or years without interruption.

18. Hanzlik, P. J.: Personal communication to the author, April 1938.
19. Stockton, A. B.: Actions of Diuretic Drugs and Changes in Metabolites in Edematous Patients, Arch. Int. Med. **58:** 891 (Nov.) 1936; footnote 17.
20. Crawford, J. H., and McIntosh, J. F.: The Use of Urea as a Diuretic in Advanced Heart Failure, Arch. Int. Med. **36:** 530 (Oct.) 1925.
21. Miller, H. R., and Feldman, A.: Prolonged Use of Massive Doses of Urea in Cardiac Dropsy, Arch. Int. Med. **49:** 964 (June) 1932.

NEPHROSIS

Despite the enormous literature devoted to the subject of nephrosis in the past thirty-five years, there is not yet complete agreement among authoritative observers as to the existence of "pure" or "lipoid" nephrosis as a separate disease entity. There is, however, general agreement that the combination of low serum proteins, profuse albuminuria, normal blood nitrogen and edema may properly be known as the "nephrotic syndrome" and that its treatment is the same whether it is regarded as resulting from a specific renal lesion, a nonspecific renal lesion (one stage in the development of chronic glomerulonephritis) or a general metabolic disease. The edema is thought to be due in large measure, as Epstein [22] first pointed out, to the marked hypoproteinemia, which results in great lowering of the colloid osmotic pressure of the blood.

The general principles of treatment include maintenance of the nutrition at the highest possible level by an adequate diet high in protein, limitation of salt and fluid intake and exercise in moderation as long as the clinical state permits. Practically all known diuretics have been tried in this condition; any of them may give satisfactory results in a given case but most of them prove quite ineffective. Thyroid has been extensively used because of the low basal rate in most patients but is seldom effective in causing diuresis, possibly because the low metabolic rate is caused in most instances by the undernutrition rather than by thyroid deficiency. The xanthine diuretics have proved useless in the hands of most observers. Encouraging results have sometimes been obtained from the use of potassium salts, as already outlined. Urea also has occasionally been effective in doses of from 15 to 50 Gm. or more a day and deserves a trial if it is tolerated. But there can be little question that the mercurial diuretics are much the most effective in the majority of cases, and they may be used without fear of increasing the renal lesion. They should be preceded by one of the acid-producing salts. In many cases the mercurials also are useless.

Because of the belief that the edema is due largely or wholly to the reduction of serum proteins, many attempts have been made to raise these to normal levels by means of diets high in protein and by the intravenous injection of such substances as whole blood, blood plasma and solutions of acacia. Leiter [23] has stated that this form of treatment, however plausible it may seem, is inevitably doomed to failure because the amount of material injected cannot be sufficient to cause an appreciable increase in the colloid osmotic pressure of the plasma and because it will be rapidly excreted from the circulation, since the glomeruli are much more permeable to colloids than normally. However, Hartmann and his collaborators,[24] Lepore,[25] Landis [26] and Shelburne [27] have all reported excellent results from the repeated and cautious intravenous injection of acacia solutions. The strength of the solutions has usually

22. Epstein, A. A.: Concerning the Causation of Edema in Chronic Parenchymatous Nephritis: Method for Its Alleviation, Am. J. M. Sc. **154:** 638 (Nov.) 1917.
23. Leiter, Louis: Nephrosis, Medicine **10:** 135 (May) 1931.
24. Hartmann, A. F.; Senn, M. J. E., Nelson, Martha V., and Perley, Anne M.: The Use of Acacia in the Treatment of Edema, J. A. M. A. **100:** 251 (Jan. 28) 1933.
25. Lepore, M. J.: Acacia Therapy in Nephrotic Edema, Ann. Int. Med. **11:** 285 (Aug.) 1937.
26. Landis, E. M.: Observations on Acacia Therapy in Nephrosis, J. A. M. A. **109:** 2030 (Dec. 18) 1937.
27. Shelburne, S. A.: Rational Use of Acacia in Treatment of the Nephrotic Syndrome, J. A. M. A. **110:** 1173 (April 9) 1938.

been from 6 to 15 per cent, in water or in physiologic solution of sodium chloride, and the injections may be given daily or at intervals of from two to four days. In practically all reported cases of benefit from acacia many diuretics had been tried without success. Following the disappearance of edema, a diet high in protein should be continued; Shelburne regards this as an essential part of the treatment.

The administration of acacia is not wholly without disadvantages, and some [28] have stated that these are so serious as to make the use of the substance unjustified. The work of Dick [28] is often quoted in support of this belief, but Shelburne [27] has recently pointed out that this work is open to serious criticism and should not prevent the proper use of a valuable therapeutic agent. Immediate reactions to injections of acacia are infrequent if the solutions are freshly and carefully prepared, but serious reactions have followed the use of impure solutions. It seems clear that if acacia is to be used it should be in a hospital rather than in the patient's home. If other methods of treatment have been tried without success and the removal of edema is highly desirable, recent experience would certainly justify the trial of acacia. If this also proves ineffective, other diuretics should be employed immediately after the acacia, as they may then prove beneficial.[26]

VITAMIN DEFICIENCY

In the past several years evidence has been presented, chiefly by Weiss and his collaborators,[29] indicating that deficiency of vitamins, especially of vitamin B_1, may lead to various types of cardiovascular dysfunction, whether the heart was previously normal or diseased. The cardiovascular manifestations do not form a fixed clinical syndrome but may include the characteristic signs of congestive heart failure with marked edema. The diagnosis of the condition may be very difficult, but the possibility of vitamin deficiency should be seriously considered when any patient with an abnormal nutritional history develops the syndrome of heart failure with edema in the absence of convincing signs of heart disease. The presence of other signs of vitamin B_1 deficiency, especially polyneuritis, glossitis and cutaneous changes suggestive of pellagra, may give an important clue. According to Strauss [30] "it is rare to observe 'beriberi heart' without at least minimal signs of polyneuritis." Both Weiss and Strauss emphasize the possible importance of measurements of the circulatory velocity and the minute volume output of the heart, as these are increased in the condition now under discussion and are conspicuously slowed in heart failure due to other causes. The response to specific therapy, however, may provide the first and most convincing evidence of the nature of the condition.

General, or nonspecific, treatment consists of the application of the measures enumerated previously: rest in bed, limitation of fluids and of salt and the administration of digitalis and diuretics. Some patients respond well to such a regimen, while others show little or no improvement; indeed, some of Weiss's patients became worse when placed at rest. Specific treatment consists of the administration of vitamin B_1. Preferably this should begin with the intravenous or intramuscular injection of from 20 to 50 mg. of thiamin chloride N. N. R. daily, and this method should be employed as a routine in the more severe cases. After improvement has occurred, usually within two weeks, the dose may be decreased to 10 or 20 mg. daily, or the larger doses may be given by mouth. If the symptoms are not particularly severe or have been largely relieved by intensive treatment, brewers' yeast may be used instead of the crystalline form of the vitamin; doses of about 30 Gm. three times a day are recommended.

The response to such treatment may be prompt and spectacular, with marked improvement in a few days and complete disappearance of symptoms and signs within two or three weeks, or improvement may be gradual over a period of six or more weeks. Rapid improvement is said to be associated with diuresis, slowing of the heart rate and rise in the arterial pressure. If there is not clear evidence of improvement after adequate dosage of vitamin B_1 for several weeks it is probable that the cardiovascular manifestations are not due to vitamin deficiency. Beneficial effects do not follow the administration of this vitamin to patients with other types of heart failure.

Weiss has properly emphasized that deficiencies are seldom limited to a single vitamin, and these patients often present evidences of inadequate intake of vitamin A and of ascorbic (cevitamic) acid, of anemia, of hypoproteinemia and possibly of other dietary deficiencies. These should, of course, receive appropriate treatment simultaneously.

MALNUTRITION

The edema, often very extensive, associated with serious degrees of malnutrition is thought to be dependent in large part on the diminished proteins of the blood plasma and the consequent lowering of the colloid osmotic pressure. It is clear that this condition may be intimately related to and complicated by the vitamin deficiency state just discussed. Diuretics may be employed, but the logical and highly effective treatment is the correction of the nutritional state by means of a proper diet rich in proteins and in vitamins. Unless the patient is dying, the dropsy usually disappears with gratifying promptness.

PICK'S DISEASE

For many years the term "Pick's disease" was used loosely and inaccurately and was applied to a number of quite different pathologic states. Now, thanks largely to the clinical reports of White [31] and the experimental and surgical studies of Beck,[32] it is possible to say with conviction that Pick's disease is actually chronic constrictive pericarditis. For the details of this important advance in our knowledge, their original papers and those of Churchill [33] and of Burwell [34] should be consulted. Among the more important clinical features of the condition may be mentioned gradual onset of dropsy, disproportionate enlargement of the liver and ascites, increased venous pressure, low arterial pressure and a heart that is normal in size or smaller than normal. A single cause is responsible for all these manifestations: the heart is so encased by unyielding fibrous

28. Dick, M. W.; Warweg, Edna, and Andersch, Marie: Acacia in the Treatment of Nephrosis, J. A. M. A. **105**: 654 (Aug. 31) 1935. Leiter.[25]

29. Weiss, Soma, and Wilkins, R. W.: The Nature of the Cardiovascular Disturbances in Nutritional Deficiency States (Beriberi), Ann. Int. Med. **11**: 104 (July) 1937; Disturbances of the Cardiovascular System in Nutritional Deficiency, J. A. M. A. **109**: 786 (Sept. 4) 1937.

30. Strauss, M. B.: The Therapeutic Use of Vitamin B_1 in Polyneuritis and Cardiovascular Conditions, J. A. M. A. **110**: 953 (March 26) 1938.

31. White, P. D.: Chronic Constrictive Pericarditis (Pick's Disease) Treated by Pericardial Resection, Lancet **2**: 539 (Sept. 7), 597 (Sept. 14) 1935.

32. Beck, C. S., and Griswold, R. A.: Pericardiectomy in the Treatment of the Pick Syndrome, Arch. Surg. **21**: 1064 (Dec.) 1930. Beck, C. S.: The Surgical Treatment of Pericardial Scar, J. A. M. A. **97**: 824 (Sept. 19) 1931. Beck, C. S., and Cushing, E. H.: Circulatory Stasis of Intrapericardial Origin: The Clinical and Surgical Aspects of the Pick Syndrome, ibid. **102**: 1543 (May 12) 1934.

33. Churchill, E. D.: Decortication of the Heart (Delorme) for Adhesive Pericarditis, Arch. Surg. **19**: 1457 (Dec., pt. 2) 1929.

34. Burwell, C. S., and Strayhorn, W. D.: Concretio Cordis, Arch. Surg. **24**: 106 (Jan.) 1932. Burwell, C. S., and Flickinger, D. D.: Obstructing Pericarditis, Arch. Int. Med. **56**: 250 (Aug.) 1935.

or calcified tissue as to be unable to dilate and fill properly during diastole. In some cases there is, in addition, marked constriction of the inferior vena cava. The immediate mechanisms of edema formation are those discussed under congestive heart failure.

The milder diuretics are of little or no value in this condition, although they may occasionally lengthen the interval between abdominal paracenteses. The mercurials, however, may prove extremely useful, as in the case reported by Noth:[35] A man aged 53 in seven and one-half years had had forty abdominal paracenteses and 450 injections of mercurial diuretics and had taken 6 Gm. (90 grains) of ammonium nitrate a day for three years. At the end of this time he presented no signs of hepatic or renal injury and had been able to continue an active life as a banker. However, if the diagnosis is reasonably certain and the patient is a good operative risk, the best treatment is surgical resection of the constricting pericardium. This often results in rapid and spectacular improvement and in restoration of the patient to normal activity, even after years of invalidism.

NEPHRITIS

The edema of acute nephritis is generally believed to be due in large part to widespread injury to the capillaries, which makes them more permeable than normally. It is theoretically unwise to administer diuretic drugs which might irritate an organ already acutely inflamed, and experience has shown conclusively that they are practically always devoid of beneficial action. In most cases diuretics are clearly unnecessary; if special circumstances seem to make a trial of such drugs essential, only the very mildest, such as urea or theobromine with sodium salicylate, should be used.

In chronic nephritis also diuretics are usually unnecessary if one excludes the "nephrotic syndrome" of chronic glomerulonephritis. But if edema becomes a serious problem almost any of the diuretics previously discussed may be used safely. The xanthines, urea and potassium salts may prove ineffective. The mercurial diuretics, combined with ammonium chloride or nitrate, are usually very satisfactory and almost never increase the renal disease. It is unwise to use these if there is acute renal inflammation or much retention of nitrogen in the blood, but extensive edema and nitrogen retention are seldom associated.

HEPATIC CIRRHOSIS

It is not often that ascites and edema of the lower extremities resulting from portal cirrhosis of the liver can be removed satisfactorily by means of diuretic drugs. It has been the almost universal experience that the milder ones, including the xanthines, urea and bismuth, are almost devoid of beneficial action. In occasional cases the mercurials, preceded by acid-forming salts, prove to be fairly satisfactory, but in most instances all that can be expected is a prolongation of the interval between abdominal paracenteses. This, however, is distinctly worth achieving, and a trial is always justified.

COMMENT

Even from the foregoing survey it is clear that the occurrence and removal of dropsy may present involved and baffling problems to the physician. Proper treatment of the underlying disease may result in disappearance of the edema, but often this must be supplemented by control of the diet, by diuretics and in some cases by surgical operation. It is highly encouraging to realize that all the specific measures discussed in this article, with the exception of the xanthines, have come into general use in this country within the past fifteen years. Our knowledge of the mechanisms involved in the formation of edema and the occurrence of diuresis have steadily widened, and our use of specific remedies has consequently become more intelligent. It is not often that the disease responsible for dropsy can be wholly cured, as in vitamin deficiency and constrictive pericarditis, but the dropsy itself can often be controlled very satisfactorily by means of medical treatment for many months or years.

303 Whitney Avenue.

35. Noth, P. H.: Pick's Disease: A Record of Eight Years' Treatment with Salyrgan, Ammonium Nitrate and Abdominal Paracentesis, Proc. Staff Meet., Mayo Clin. **12**: 513 (Aug. 18) 1937.

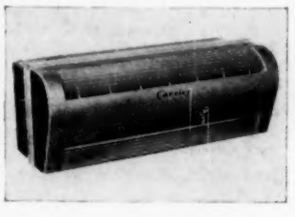
Council on Physical Therapy

THE COUNCIL ON PHYSICAL THERAPY HAS AUTHORIZED PUBLICATION OF THE FOLLOWING REPORTS. HOWARD A. CARTER, Secretary.

CARRIER ROOM VENTILATOR, TYPE 56B, ACCEPTABLE

Manufacturer: The Carrier Corporation, Syracuse, N. Y.

The Carrier Room Ventilator, Type 56B, is designed to cause the circulation of outside and inside air in a room and to filter out dust and pollen. The unit is equipped with a fluted filter consisting of two layers of crinoline enclosing a thin layer of cotton and fastened in a sturdy cardboard case. The unit also contains two motor-driven sirocco type blowers mounted in a metal case with louvers for the air outlets. The intake is located in the lower back of the unit, where it extends out of the window. A damper provides means for adjusting the proportions of outside and recirculated air. Sound insulation is also provided in the mechanism.



Carrier Room Ventilator, Type 56B.

The ventilator comes in two sizes, the smaller one providing 250 cubic feet of air per minute and designed for average sized rooms. Dimensions are 24 inches long by 11⅝ inches deep and 9 inches high; the shipping weight is approximately 35 pounds. The larger size, designed for larger rooms, offices and apartments, supplies up to 500 cubic feet of air per minute. Dimensions are 31 inches long, 11⅛ inches high and 14 3/16 inches deep; the shipping weight is approximately 50 pounds.

The standard fan motor is a 110 volt, 60 cycle, single phase type. The larger unit has a variable speed adjustment; the smaller unit a single speed motor. The filter fits in the frame attached to the hinged top cover of the unit and is held in place by two adjustable levers.

The firm claims that the unit "supplies cleaned, outside air, without drafts; circulates filtered, refreshing, room air; shuts out noise, dirt, dust and pollen." The firm submitted evidence to support these claims and the following Council investigation was also conducted to test their validity:

The unit was installed as it would be in practice, and tests were conducted during a portion of the 1939 ragweed, hay fever season. Greased slides were placed at the outlet louvers, examined for pollen and compared with slides exposed outdoors. These tests showed an efficiency of the unit for pollen removal of more than 97 per cent for the first week of operation. It was permitted to run continuously for another week and again tested. There was no change in filters, the filters having been used for two weeks of continuous operation. At the end of this time the efficiency had dropped to 96 per cent for pollen removal. Apparently the filter loses some of its efficiency in time for holding pollen. The filter is of the discardable type and should be renewed as frequently as local conditions demand. The tests were conducted when there were large quantities of dust in the air. Coarse particles of dust may, by repeated bombardment

against the filter, rupture it sufficiently to allow passage of pollen, but this may happen to any filter.

In view of the foregoing report the Council on Physical Therapy voted to accept the Carrier Room Ventilator, Type 56B, for inclusion on the Council's list of accepted devices.

COLD QUARTZ ULTRAVIOLET LAMP EXEMPLAR MODEL ACCEPTABLE

Manufacturer: E. J. Rose Manufacturing Company, 727-733 East Gage Avenue, Los Angeles.

The Cold Quartz Ultraviolet Lamp, Exemplar Model, catalogue number 4005, provides ultraviolet generators of the body grid, tangency equalization and orificial types, and is designed strictly for use by physicians. The main lamp assembly consists of a detachable fused quartz grid attached to a corrugated aluminum reflector mounted to a reflector case; the dome shaped reflector case has an outside diameter of 31 cm. (12¼ inches) and consists of a bakelite back covering the burner electrodes and an aluminum shell which acts as a support for the burner and its reflector. The lamp is attached to a horizontal arm which pivots both at the upright standard and at a section joint. The arm may thus be extended to the full length of 25 inches or folded to a smaller length. The transformer, automatic timer, connecting receptacle for body grid and orificial generators and line cord connection are mounted in the floor base, while the orificial generator is contained within a case on the vertical part of the stand.

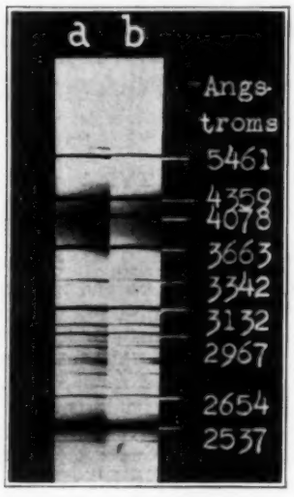


Fig. 1.—Spectrograms—Hilger quartz spectrograph, Eastman D C Orthoplates: *a*, orificial unit; *b*, general body lamp.

The lamp may be adjusted up to a height of 60 inches, and a pneumatic cushion is provided to prevent accidental shock to the grid element while it is being lowered. The lamp may be furnished either with the body grid generator alone (number 4005-B) or with the body grid plus the orificial generator, orificial cable, rayon protective sleeving and two pairs of goggles (number 4005-C).

Tubing of the grid is coiled in a flat, hexagonal pattern, is 7 mm. in diameter and has an exposed length of 60 inches. It is highly evacuated of air and the space is supplanted with an atmosphere of rare gases, xenon, krypton and argon, and a few drops of mercury. The cold quartz orificial unit is made of double core, fused quartz tubing and has a bakelite handle or case covering the electrode terminals. A high tension cable connects this unit to the standard high voltage transformer at the top of the tubular column.

Fig. 2.—Cold Quartz Ultraviolet Lamp, Exemplar Model.

The firm provided physical data from a reliable laboratory abstracted as follows: The power consumption of the lamp is 62 watts at 115 volts. During a two hour continuous test, no part of the lamp or transformer became heated. It produced 900 microwatts per square centimeter of ultraviolet radiation at 16 inches. The spectral energy distribution measured by an ultraviolet photometer was 89 per cent between 2,000 and 2,600 angstroms, 10 per cent between 2,600 and 3,000 angstroms and 1 per cent between 3,000 and 3,200 angstroms. A spectrogram is shown in figure 1.

The orificial unit had the same spectral distribution as the general body lamp and sufficient energy to develop a perceptible erythema in less than one second when applied directly to the untanned skin. Physiologic tests on abdominal untanned skin confirmed the photometer measurements as to erythema time with the body lamp. Physiologic tests gave a perceptible erythema in thirty seconds at 16 inches.

Tests made for the Council substantially confirmed this report.

The Council on Physical Therapy voted to accept the Cold Quartz Ultraviolet Lamp, Exemplar Model, for inclusion on the Council's list of accepted devices.

Council on Pharmacy and Chemistry

NEW AND NONOFFICIAL REMEDIES

E. R. SQUIBB & SONS WAS NOTIFIED OF THE ACCEPTANCE OF AMNIOTIN IN MAY 1939. AT THE TIME THAT THE DESCRIPTION WAS READY TO APPEAR IN THE JOURNAL, THERE AROSE QUESTIONS CONCERNING FURTHER CONSIDERATION OF THE STANDARDS. IT SEEMED ADVISABLE, THEREFORE, TO DEFER PUBLICATION OF THE ACCEPTANCE IN ORDER THAT, AT THE SAME TIME, THE REVISED STANDARDS MIGHT BE INCLUDED.

PAUL NICHOLAS LEECH, Secretary.

AMNIOTIN.—A liquid containing a highly concentrated, noncrystalline preparation of estrone (ketohydroxyestrin) together with a small varying amount of other estrogenic ketones extracted from the urine of pregnant mares.

Actions and Uses.—Amniotin is used either orally or by hypodermic injection of an oil solution in the same conditions for which estrone (theelin) and estriol (theelol) are recommended.

Dosage.—From 2,000 to 20,000 international units injected one or more times weekly depending on the response of the patient. After relief has been produced, dosage may be lowered to a maintenance level. As much as 15,000 international units per week may be required in resistant cases of kraurosis vulvae. Amniotin suppositories are valuable adjuncts in the treatment of senile vaginitis.

Occasionally a considerable amount of uterine bleeding occurs in menopausal women following large doses of estrogenic substance. This may be quite alarming at times and it is therefore suggested that the dose be reduced as soon as feasible.

For gonorrheal vaginitis in children from 1,000 to 2,000 international units daily in glycerogelatin suppositories may be required. This may be supplemented by intramuscular injection of small doses of the oil solution, if necessary. Changes in the secondary sex organs may be produced by this therapy, particularly if it is too prolonged. These changes usually regress on cessation of treatment. Estrogenic products must be used with care.

Amniotin capsules, 1,000 or 2,000 international units, one or more times daily may be administered orally alone or as a supplement to parenteral therapy.

Urine from pregnant mares, collected after the fifth month of pregnancy, is acidified with hydrochloric acid to *p*H 1.5 and boiled for three hours. The hydrolyzed urine is extracted with ethylene dichloride, and the extract evaporated to dryness. The residue is dissolved in ether, the ether solution is washed with half saturated sodium carbonate solution, followed by tenth normal sodium hydroxide and finally the ether removed by distillation. This residue is dissolved in toluene and the amniotin is extracted from the toluene with normal sodium hydroxide. This alkaline extract, after neutralization with hydrochloric acid, is extracted with toluene, and the toluene solution, after washing with water, is evaporated to dryness.

This residue is further purified by high vacuum fractional distillation. The resulting residue is dissolved in sterile vegetable oil for hypodermic and oral use and incorporated in a glycerin gelatin base for vaginal administration.

Amniotin is assayed by a modification of the Coward and Burn method in direct comparison with the international standard. The potency is expressed in terms of the international unit. One international unit is defined by the League of Nations Health Organization as the specific estrus producing activity contained in 0.1 microgram (0.0001 mg.) of the standard crystalline ketohydroxy estrin ($C_{18}H_{22}O_2$). The physiologic criterion of activity is the appearance of cornified cells in the vaginal smear of a castrated rat.

Manufactured by E. R. Squibb & Sons, New York, N. Y. No U. S. patent. Trademark No. 318536.

Amniotin in Oil, 2,000 International Units: Each cubic centimeter contains 2,000 international units of estrogenic substance.

Amniotin in Oil, 10,000 International Units: Each cubic centimeter contains 10,000 international units of estrogenic substance.

Amniotin in Oil, 20,000 International Units: Each cubic centimeter contains 20,000 international units of estrogenic substance.

Amniotin Capsules, 1,000 International Units: Each capsule contains 1,000 international units of estrogenic substance.

Amniotin Capsules, 2,000 International Units: Each capsule contains 2,000 international units of estrogenic substance.

Amniotin Capsules, 4,000 International Units: Each capsule contains 4,000 international units of estrogenic substance.

Amniotin Pessaries, 1,000 International Units: Each pessary contains 1,000 international units of estrogenic substance in a glycerogelatin base.

Amniotin Pessaries, 2,000 International Units: Each pessary contains 2,000 international units of estrogenic substance in a glycerogelatin base.

TUBERCULOSIS FACILITIES IN THE UNITED STATES

A FOLLOW-UP ON THE SURVEY OF 1933-1935 BY THE COUNCIL ON MEDICAL EDUCATION AND HOSPITALS OF THE AMERICAN MEDICAL ASSOCIATION

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In 1935 the Council on Medical Education and Hospitals published a report of a two year study of tuberculosis facilities in the United States.[1] This was based on the inspection of 656 hospitals and sanatoriums, the analysis of 602 special questionnaires, and supplementary reports from 5,600 other hospitals that had been requested to furnish information concerning the hospitalization of tuberculous patients.

The original report contained the names of 1,240 institutions, 471 sanatoriums, 740 tuberculosis departments and twenty-nine preventoriums, all listed in accordance with the following classification: 1. Sanatorium — an institution operating exclusively for the treatment of tuberculosis. 2. Tuberculosis department —a hospital service devoted in part to tuberculosis care. 3. Preventorium—a separate unit for tuberculous contacts or children with the first infection type of disease. The preventorium classification did not include summer camps for children or preventorium units conducted as part of a sanatorium or other hospital service.

The same terminology will be retained in the present report, although additional information is now available concerning preventorium facilities in the sanatorium group.

PURPOSE OF SURVEY

The present report constitutes a follow-up on the survey of 1933-1935, conducted in large part by Fritjof H. Arestad, M.D., of the Council's staff of hospital examiners, who also directed the former study. It serves mainly to indicate the current status of tuberculosis hospitalization by recording changes in bed capacity and patient population over a period of five years, but also has for its purpose the presentation of factual data that can be utilized as a quantitative measure in the evaluation of sanatorium facilities.

A qualitative analysis is not a primary consideration at this time yet the report cannot help but reflect the degree of standardization that has been attained in individual institutions. Thus the survey should prove useful in the interpretation of sanatorium needs, a function that can best be ascribed to physicians specializing in tuberculosis, directors of sanatorium services, departments of health, tuberculosis associations and other agencies intimately concerned with the problem of tuberculosis control.

METHOD OF STUDY

The information required in the present investigation of sanatorium facilities was readily obtained in connection with the Annual Census of hospitals registered

(II) Tuberculosis Service:

(A reply is desired from all tuberculosis sanatoriums, hospitals and departments which admitted tuberculous patients during the twelve month period listed above.)

1. Number of beds set aside for tuberculosis:
   For adults..... For children..... Total.....
2. How many of children's beds are for preventorium care?.....
3. Patients admitted to tuberculosis service during year:
   Men..... Women.....
   Children (under 15 years)..... Total.....
4. Of patients admitted how many were received by transfer from other tuberculosis institutions? .....
5. Condition on admission: Number of first infection type.....
   Minimal pulmonary tuberculosis.....
   Moderately advanced.....Far advanced.....
   Nonpulmonary tuberculosis.....Other.....
6. Tuberculous patients discharged during year (exclude deaths):
   Men..... Women.....
   Children..... Total.....
7. Of patients discharged how many were transferred to other institutions? .....
8. Number of deaths from tuberculosis.....
9. Census of patients in tuberculosis division:
   a. At beginning of twelve month period:

Men	Women	Children Under 15	Total
.....	.....	.....	.....

   b. Average daily census during year:

Men	Women	Children Under 15	Total
.....	.....	.....	.....

   c. Census on Sept. 30, 1938:

Men	Women	Children Under 15	Total
.....	.....	.....	.....

10. Number on waiting list Sept. 30, 1938.....
11. Is pneumothorax available for inpatients?.....
    For outpatients? .....

1. Survey of Tuberculosis Hosptals and Sanatoriums in the United States, J. A. M. A. **105**: 1855 (Dec. 7) 1935.

by the American Medical Association. Accordingly, it did not seem necessary to repeat the inspection procedure carried out in the previous survey.

After consultation with the National Tuberculosis Association, the questionnaire on the preceding page was incorporated in the regular information blanks forwarded to 6,198 hospitals during the latter part of 1938.

Other sections of the blank requested information concerning ownership and control, scope of hospital and outpatient service, x-ray and laboratory facilities, nursing personnel, interns, resident physicians and medical staff.

patients admitted or treated during the year. This group includes 479 sanatoriums, 630 tuberculosis departments and thirty-one preventoriums. In addition there are 584 hospitals that admit tuberculous patients or conduct tuberculosis clinics yet did not report the extent of their service.

The variation from the 1935 report showing 1,240 institutions is largely a decrease in the number of tuberlosis departments from 740 to 630. This, in turn, is mainly a reduction in the nervous and mental field, in which only ninety-two departments were reported as compared to 193 in the previous survey.

Table 1.—Classification of Tuberculosis Institutions by States and by Control

State	Federal			State		County			City		City-County			Private			Totals			Total Institutions
	Sanatoriums	Departments	Preventoriums	Sanatoriums	Departments	Sanatoriums	Departments	Preventoriums	Sanatoriums	Departments	Sanatoriums	Departments	Preventoriums	Sanatoriums	Departments	Preventoriums	Sanatoriums	Departments	Preventoriums	
Alabama	..	3	..	..	1	5	..	..	..	..	..	..	..	2	3	..	7	7	..	14
Arizona	4	6	..	1	..	..	5	1	..	..	..	..	..	10	6	..	15	17	1	33
Arkansas	..	1	..	2	1	..	2	..	..	1	..	..	..	..	..	..	2	5	..	7
California	2	10	..	..	2	12	22	3	..	..	1	1	..	24	10	5	39	45	8	92
Colorado	..	1	..	..	2	..	1	..	..	..	..	1	..	15	9	..	15	14	..	29
Connecticut	..	..	..	5	2	..	..	..	..	3	..	..	..	3	1	..	8	6	..	14
Delaware	..	..	..	2	1	..	..	..	..	..	..	..	..	..	1	1	2	2	1	5
Dist. of Columbia	..	5	..	..	..	..	..	..	1	2	..	..	..	..	3	..	1	10	..	11
Florida	..	2	..	1	3	2	3	..	..	4	2	..	..	2	3	1	7	15	1	23
Georgia	..	3	..	1	..	1	..	..	..	1	2	..	..	..	1	1	4	5	1	10
Idaho	1	..	..	..	1	..	..	..	..	..	..	..	..	..	3	..	1	4	..	5
Illinois	..	3	..	..	9	17	2	..	4	..	..	..	..	6	12	1	27	26	1	54
Indiana	..	2	..	1	1	9	..	..	..	1	..	..	..	..	4	..	10	8	..	18
Iowa	1	1	..	1	6	4	..	..	..	..	..	..	..	..	7	..	6	14	..	20
Kansas	..	5	..	2	1	1	..	..	..	..	1	..	..	..	5	..	4	11	..	15
Kentucky	1	2	..	1	4	2	..	..	..	1	1	..	..	..	5	..	5	12	..	17
Louisiana	..	2	..	1	1	..	..	..	..	..	..	..	..	4	4	..	5	7	..	12
Maine	..	2	..	3	2	..	..	..	..	..	..	..	..	1	3	..	4	7	..	11
Maryland	..	3	..	4	3	..	..	..	..	1	..	..	..	3	3	..	7	10	..	17
Massachusetts	..	2	..	4	7	7	1	..	2	7	..	..	..	9	9	1	22	26	1	49
Michigan	..	2	..	3	9	10	4	..	2	2	..	..	..	10	9	1	25	26	1	52
Minnesota	..	3	..	1	4	13	..	..	..	2	..	1	1	2	6	..	16	16	1	33
Mississippi	..	1	..	1	2	2	..	..	..	1	..	..	..	1	14	..	4	18	..	22
Missouri	..	4	..	1	1	1	..	..	2	6	..	..	..	2	8	1	6	19	1	26
Montana	..	3	..	1	..	..	1	..	..	..	..	1	..	..	4	..	1	9	..	10
Nebraska	..	2	..	1	2	..	1	..	..	1	..	..	..	..	2	..	1	8	..	9
Nevada	..	2	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	4	..	4
New Hampshire	..	..	..	1	..	..	..	..	..	..	..	..	..	1	1	..	2	1	..	3
New Jersey	..	..	..	1	6	11	3	..	..	5	..	..	..	5	8	1	17	22	1	40
New Mexico	3	4	..	1	1	..	..	..	..	..	..	..	..	3	6	..	7	11	..	18
New York	2	7	..	4	14	26	3	1	5	15	1	1	..	20	20	3	58	60	4	122
North Carolina	1	1	..	2	2	7	1	..	..	..	1	..	..	9	3	..	20	7	..	27
North Dakota	..	3	1	1	1	..	1	..	..	..	..	..	..	..	3	..	1	8	1	10
Ohio	..	2	..	1	8	15	..	..	1	2	..	..	..	5	15	2	22	27	2	51
Oklahoma	2	6	..	2	1	..	..	..	..	..	..	..	..	1	3	..	5	10	..	15
Oregon	..	1	..	2	1	1	..	..	..	..	..	..	..	1	..	..	4	2	..	6
Pennsylvania	..	2	..	3	10	4	5	1	1	4	1	1	..	7	14	1	16	36	2	54
Rhode Island	..	..	..	1	1	..	..	..	..	1	..	..	..	1	..	1	2	2	1	5
South Carolina	..	1	..	1	..	3	1	..	..	..	1	..	..	1	1	..	6	3	..	9
South Dakota	1	2	..	1	..	..	..	..	..	..	..	..	..	..	3	..	2	5	..	7
Tennessee	..	3	..	..	2	1	..	..	..	..	2	..	1	3	6	..	6	11	1	18
Texas	..	5	..	2	3	3	1	..	..	1	3	1	..	10	6	..	18	17	..	35
Utah	..	1	..	1	..	..	1	..	..	..	..	..	..	..	3	..	1	5	..	6
Vermont	..	..	..	2	1	..	..	..	..	..	..	..	..	..	1	1	2	2	1	5
Virginia	..	5	..	3	5	..	..	..	2	..	..	..	..	3	1	..	8	11	..	19
Washington	1	9	..	..	2	6	1	..	..	1	..	..	..	2	4	..	9	17	..	26
West Virginia	..	1	..	3	..	2	..	..	..	..	..	..	..	2	3	..	7	4	..	11
Wisconsin	..	3	..	2	3	17	1	1	..	..	..	..	..	2	7	..	21	14	1	36
Wyoming	..	3	..	1	..	..	..	..	..	..	..	..	..	..	1	..	1	4	..	5
Totals	19	129	1	72	126	182	62	7	20	62	16	7	2	170	244	21	479	630	31	1,140

Reports were received from 5,950 hospitals, including all of the sanatoriums, the principal tuberculosis departments and all hospitals approved for intern and residency training. The completeness of returns, as measured by a total response of 96 per cent (99 per cent of bed capacity), testifies to the splendid cooperation extended by hospital and sanatorium superintendents. The statistical data included in this report represent a twelve months period ended either Sept. 30 or Dec. 31, 1938.

NUMBER OF TUBERCULOSIS INSTITUTIONS

Listed in the present report are 1,140 institutions that have either specified the number of beds for tuberculosis or else indicated the number of tuberculous

The sanatoriums in operation at the present time include nineteen federal, seventy-two state, 182 county, twenty municipal, sixteen city-county and 170 under private control. Reference should be made to table 1 and also to the corresponding section of the 1935 report. Of the federal sanatoriums, six are operated by the United States Veterans Bureau, one by the United States Public Health Service and twelve by the Indian Administration of the Department of the Interior.

Table 2, showing classification of tuberculosis institutions by control, contains comparative data for 1934. Included at present are 129 federal departments, 126 state, sixty-two county, sixty-two city, seven city-county and 244 private hospitals. A similar classification of

tuberculosis departments by type and control, as represented in table 3, shows that 439 are in general hospitals, ninety-two in mental institutions, twenty-six in isolation hospitals, eight in orthopedic units and sixty-five in other types of hospitals. It is of interest to note that there has been an increase from 418 to 439 in the general hospital group since the survey of 1935.

Table 2.—Tuberculosis Institutions Classified by Control

Control	Sanatoriums		Departments		Preventoriums		Total	
	1934	1938	1934	1938	1934	1938	1934	1938
Indian Administration	11	12	41	32	..	1	52	45
U. S. Army	..	..	13	18	..	..	13	18
U. S. Navy	..	..	10	7	..	..	10	7
U. S. Public Health Serv.	1	1	25	19	..	..	26	20
Veterans Bureau	6	6	59	44	..	..	65	50
Other Federal	..	..	3	9	..	..	3	9
State	65	72	219	126	..	..	284	198
County	173	182	71	62	6	7	250	251
City	22	20	58	62	..	..	80	82
City-County	15	16	7	7	2	2	24	25
Private	178	170	234	244	21	21	433	435
Totals	471	479	740	630	29	31	1,240	1,140

The preventoriums have increased from twenty-nine to thirty-one, but this group contains only those services that operate independently and on a permanent basis. This classification will be supplemented, however, by a further description of preventorium facilities in sanatoriums and other hospitals. Included in the preventorium group are seven under county control, two city-county, twenty-one private and one operated by the Indian Administration.

It may be of interest at this time to note that 314 sanatoriums have physicians in charge, eighty-six have nurse superintendents and seventy-nine have lay administrators. In the tuberculosis departments the corresponding figures are 344, 121 and 165; in the preventoriums, twelve, thirteen and six. Reference should be made to table 4 showing the classification of superintendents in accordance with the type of administrative control.

SIZE OF TUBERCULOSIS INSTITUTIONS

Tables 5 and 6 relate to the classification of tuberculosis institutions by size according to control and type of service. A marked similarity is noted on comparison with the former report except in the column showing tuberculosis departments of less than twenty-five beds, which include all services that do not specify bed capacity yet report a certain number of tuberculous patients admitted or treated during the year. The decrease of ninety-three in this column approximates the reduction of 101 departments in the nervous and mental group as already referred to.

In the general hospitals there are 309 departments of less than twenty-five beds, fifty-one with a capacity of twenty-five to forty-nine beds, thirty-eight of fifty to ninety-nine beds and forty-one in the classification of

Table 3.—Classification of Tuberculosis Departments by Type and Control

Type	Federal	State	County	City	City-County	Private	Total
General	109	15	47	39	5	224	439
Mental	14	71	4	2	..	3	92
Tb-Isolation	..	..	5	20	1	..	26
Orthopedic	..	3	..	..	..	5	8
Other	6	37	6	1	1	14	65
Totals	129	126	62	62	7	244	630

Table 4.—Classification of Administrative Control

Superintendent	Federal			State			County			City			City-County			Private			Total			Grand Total
	Sanatorium	Department	Preventorium	Sanatorium	Department	Preventorium	Sanatorium	Department	Preventorium	Sanatorium	Department	Preventorium	Sanatorium	Department	Preventorium	Sanatorium	Department	Preventorium	Sanatorium	Department	Preventorium	
Doctor of Medicine	19	111	..	68	99	..	132	40	6	16	32	..	8	4	2	71	58	4	314	344	12	670
Registered Nurse	..	..	..	1	2	..	30	3	..	3	12	..	8	..	..	44	104	13	86	121	13	220
Layman	..	18	1	3	25	..	20	25	1	1	12	..	..	3	..	55	82	4	79	165	6	250
Totals	19	129	1	72	126	..	182	68	7	20	56	..	16	7	2	170	244	21	479	630	31	1,140

Table 5.—Tuberculosis Institutions Classified by Size and Control

Control	Less Than 25 Beds			25 to 49 Beds			50 to 99 Beds			100 Beds and Over			Total			Total Institutions
	Sanatoriums	Departments	Preventoriums	Sanatoriums	Departments	Preventoriums	Sanatoriums	Departments	Preventoriums	Sanatoriums	Departments	Preventoriums	Sanatoriums	Departments	Preventoriums	
Indian Administration	..	28	..	2	2	..	5	..	1	5	2	..	12	32	1	45
U. S. Army	..	15	..	..	1	..	..	1	..	..	1	..	..	18	..	18
U. S. Navy	..	5	..	..	1	..	..	1	..	..	..	..	..	7	..	7
U. S. Public Health Service	..	9	..	..	7	..	..	2	..	1	1	..	1	19	..	20
Veterans Bureau	..	15	..	..	12	..	..	5	..	6	12	..	6	44	..	50
Other Federal	..	7	..	..	..	..	..	1	..	..	1	..	..	9	..	9
State	..	51	..	5	14	..	5	37	..	62	24	..	72	126	..	198
County	10	23	2	34	16	1	67	12	2	71	11	2	182	62	7	251
City	..	25	..	..	9	..	3	13	..	17	15	..	20	62	..	82
City-County	1	2	..	2	1	..	5	1	2	8	3	..	16	7	2	25
Private	27	211	4	43	20	6	56	9	6	44	4	5	170	244	21	435
Totals	38	391	6	86	83	7	141	82	11	214	74	7	479	630	31	1,140

100 beds or over. As a rule, the smaller departments are utilized mainly for temporary care — emergency treatments, diagnostic procedures or tuberculosis surgery—while the larger units may well be considered as regular sanatorium services.

Table 6.—Tuberculosis Departments Classified by Size and Type

Type	Less than 25 Beds	25 to 49 Beds	50 to 99 Beds	100 Beds and Over	Total
General	309	51	38	41	439
Mental	16	19	33	24	92
Tb-Isolation	6	6	6	8	26
Orthopedic	5	2	..	1	8
Other	55	5	5	..	65
Totals	591	83	82	74	636

Over half of the tuberculosis departments in isolation hospitals have more than fifty beds, yet from the standpoint of bed capacity alone it would appear that the sanatorium service is the smaller of the two units in most of these institutions. In the sanatorium group thirty-eight have less than twenty-five beds, eighty-six have from twenty-five to forty-nine beds, 141 have from fifty to ninety-nine beds and 214 report 100 beds or more.

BED CAPACITY

The survey of 1935 reported 95,198 beds for the treatment of tuberculosis. As indicated in table 7 there are now 98,801 beds available, including 87,084 for adults and 11,717 for children. Incidentally the capacity for children is practically identical with the figure of 11,647 reported in the previous survey. The sanatoriums have 70,713 beds, the tuberculosis departments 25,944 and the preventoriums 2,144. The private group reports 16,946 beds, federal hospitals 9,076 and the remaining public institutions 72,799: state 28,699, county 26,840, municipal 13,759, city-county 3,481. In federal hospitals the bed capacity for tuberculosis showed a decrease of 1,864; in the private group the reduction was 776. The other institutions, however, showed an increase of 6,187.

The federal hospitals report tuberculosis beds as follows: U. S. Army 617, U. S. Navy 152, U. S. Public Health Service 811, U. S. Veterans Bureau 5,671, Indian Administration 1,609, others 216.

The sanatorium division has 70,713 beds as compared to 64,997 in 1935. The federal sanatoriums have 3,970 beds, state sanatoriums 21,066, county 22,206, municipal 8,486, city-county 2,191, and the private sanatoriums 12,794. Six sanatoriums operated by the

Table 7.—Bed Capacity of Tuberculosis Institutions Classified by States

State	Sanatoriums			Departments			Preventoriums	Total Beds		
	Beds for Adults	Beds for Children	Total	Beds for Adults	Beds for Children	Total	Beds for Children	Adults	Children	Total
Alabama	352	12	364	103	5	108	...	455	17	472
Arizona	622	126	748	614	16	630	130	1,236	272	1,508
Arkansas	637	95	732	128	...	128	...	765	95	860
California	4,192	535	4,727	2,312	241	2,553	394	6,504	1,170	7,674
Colorado	1,400	76	1,476	908	...	908	...	2,308	76	2,384
Connecticut	1,234	427	1,661	213	...	213	...	1,447	427	1,874
Delaware	154	46	200	17	...	17	24	171	70	241
District of Columbia	400	300	700	348	6	354	...	748	306	1,054
Florida	525	22	547	322	4	326	25	847	51	898
Georgia	484	175	659	54	...	54	15	538	190	728
Idaho	...	132	132	45	...	45	...	45	132	177
Illinois	3,598	183	3,781	1,461	14	1,475	48	5,059	245	5,304
Indiana	1,373	142	1,515	204	...	204	...	1,577	142	1,719
Iowa	805	55	860	125	12	137	...	930	67	997
Kansas	629	44	673	124	6	130	...	753	50	803
Kentucky	958	125	1,083	324	1	325	...	1,282	126	1,408
Louisiana	369	16	385	500	...	500	...	869	16	885
Maine	429	56	485	105	...	105	...	534	56	590
Maryland	1,112	194	1,306	395	...	395	...	1,507	194	1,701
Massachusetts	3,038	530	3,568	1,256	39	1,295	135	4,294	704	4,998
Michigan	3,271	340	3,611	1,965	43	2,008	30	5,236	413	5,649
Minnesota	1,960	78	2,038	714	10	724	80	2,674	168	2,842
Mississippi	493	50	543	48	...	48	...	541	50	591
Missouri	1,748	86	1,834	405	14	419	81	2,153	181	2,334
Montana	198	10	208	42	9	51	...	240	19	259
Nebraska	128	33	161	217	...	217	...	345	33	378
Nevada	...	...	...	14	...	14	...	14	...	14
New Hampshire	221	25	246	...	...	...	...	221	25	246
New Jersey	2,967	340	3,307	1,338	97	1,435	225	4,305	662	4,967
New Mexico	570	81	651	418	5	423	...	988	86	1,074
New York	8,882	1,465	10,347	4,772	259	5,031	257	13,654	1,981	15,635
North Carolina	2,298	111	2,409	35	44	79	...	2,333	155	2,488
North Dakota	358	10	368	18	5	23	80	376	95	471
Ohio	2,893	456	3,349	891	27	918	100	3,784	583	4,367
Oklahoma	852	80	932	182	37	219	...	1,034	117	1,151
Oregon	570	36	606	6	1	7	...	576	37	613
Pennsylvania	3,454	693	4,147	1,599	112	1,711	188	5,053	993	6,046
Rhode Island	623	82	705	143	...	143	68	766	150	916
South Carolina	686	62	748	86	...	86	...	772	62	834
South Dakota	304	...	304	38	...	38	...	342	...	342
Tennessee	920	265	1,185	207	1	208	50	1,127	316	1,443
Texas	1,831	246	2,077	666	...	666	...	2,497	246	2,743
Utah	96	...	96	48	...	48	...	144	...	144
Vermont	127	...	127	1	...	1	80	128	80	208
Virginia	1,152	124	1,276	350	...	350	...	1,502	124	1,626
Washington	700	77	777	595	273	868	...	1,295	350	1,645
West Virginia	772	90	862	11	6	17	...	783	96	879
Wisconsin	2,010	154	2,164	269	1	270	134	2,279	289	2,568
Wyoming	33	...	33	20	...	20	...	53	...	53
Totals	62,428	8,285	70,713	24,656	1,288	25,944	2,144	87,084	11,717	98,801

United States Veterans Bureau have 2,713 beds, one under the control of the United States Public Health Service has 244, and twelve assigned to the Indian Administration report 1,013. Included in the sanatorium group are 8,285 beds for children distributed in the following manner as indicated in table 8: Indian Administration 319, state 2,877, county 2,706, city 1,149, city-county 436 and private 798.

Information concerning bed capacity in tuberculosis departments is contained in tables 7, 8 and 9. These indicate that general hospitals have 14,824 beds for tuberculosis, mental institutions 7,189, isolation hospitals 2,813, orthopedic units 283 and other institutions 835, a total of 25,944. This represents a reduction of 2,590 beds since the previous report, although increases of 358 and 257 occurred in the general and isolation hospitals respectively.

show that there were 122,342 admissions in 1938, including 59,599 men, 40,894 women, 13,400 children and 8,449 not classified. The number of readmissions are not known, but patients received by transfer from other institutions totaled 7,254.

The sanatoriums admitted 76,808 patients: 34,308 men, 29,049 women, 8,332 children and 5,119 unclassified. In table 11, showing admissions in tuberculosis institutions according to control, it can be seen that the private sanatoriums admitted 14,644, the federal sanatoriums 5,722 and the remaining public sanatoriums 56,442.

The tuberculosis departments reported 42,230 admissions: 9,178 in federal institutions, 6,880 in private hospitals and 26,172 in the other departments. Admissions to tuberculosis units in general hospitals totaled 34,739, isolation hospitals 4,112, mental institutions

Table 8.—Bed Capacity of Tuberculosis Institutions Classified by Control

Control	Sanatoriums			Departments			Preventoriums	Total Beds		
	Beds for Adults	Beds for Children	Total	Beds for Adults	Beds for Children	Total	Beds for Children	Adults	Children	Total
Indian Administration	694	319	1,013	264	252	516	80	958	651	1,609
U. S. Army	...	...	...	611	6	617	...	611	6	617
U. S. Navy	...	...	...	152	...	152	...	152	...	152
U. S. Public Health Service	244	...	244	567	...	567	...	811	...	811
Veterans Bureau	2,713	...	2,713	2,958	...	2,958	...	5,671	...	5,671
Other Federal	...	...	...	216	...	216	...	216	...	216
State	18,189	2,877	21,066	7,496	137	7,633	...	25,685	3,014	28,699
County	19,500	2,706	22,206	3,770	374	4,144	490	23,270	3,570	26,840
City	7,337	1,149	8,486	5,114	159	5,273	...	12,451	1,308	13,759
City-County	1,755	436	2,191	1,025	135	1,160	130	2,780	701	3,481
Private	11,996	798	12,794	2,483	225	2,708	1,444	14,479	2,467	16,946
Totals	62,428	8,285	70,713	24,656	1,288	25,944	2,144	87,084	11,717	98,801

Table 9.—Bed Capacity of Tuberculosis Departments Classified by Type and Control

Type	Federal			State			County			City			City-County			Private			Total		
	Adults	Children	Total	Adults	Children	Total	Adults	Children	Total	Adults	Children	Total	Adults	Children	Total	Adults	Children	Total	Adults	Children	Total
General	4,278	258	4,536	871	34	905	2,664	269	2,933	2,889	52	2,941	1,011	135	1,146	2,226	137	2,363	13,939	885	14,824
Mental	452	...	452	6,077	30	6,107	464	...	464	120	...	120	...	...	...	...	46	46	7,113	76	7,189
Tb.-Isolation	...	...	...	...	..	...	504	105	609	2,089	107	2,196	8	...	8	...	...	...	2,601	212	2,813
Orthopedic	...	...	...	...	73	73	...	...	...	...	...	...	...	...	...	190	20	210	190	93	283
Other Hospitals	38	...	38	548	..	548	138	...	138	16	...	16	6	...	6	67	22	89	813	22	835
Totals	4,768	258	5,026	7,496	137	7,633	3,770	374	4,144	5,114	159	5,273	1,025	135	1,160	2,483	225	2,708	24,656	1,288	25,944

Federal departments reported 5,026 beds, state 7,633, county 4,144, city 5,273, city-county 1,160 and private departments 2,708. Included in these figures are 1,288 beds for children.

In the preventorium group are included thirty-one institutions with a capacity of 2,144 beds. A preventorium operated by the Indian Administration has eighty beds, seven under county control have 490, two classified as city-county accommodate 130 and twenty-one private preventoriums accommodate 1,444.

The preventorium service is more extensive, however, than has been indicated. Tables 27 and 28 show that there are 2,686 additional beds for preventorium purposes: 2,447 in the sanatorium division and 239 in the tuberculosis departments. Thus it is apparent that, of a total of 11,717 beds for children, 4,830 are now utilized for preventorium care.

NUMBER OF PATIENTS ADMITTED

In the previous investigation of tuberculosis facilities it was found that 121,706 patients were admitted during a period of one year. Reference to table 10 will

1,874, orthopedic units 475 and other departments 1,030. This indicates a decrease of 551 patients in the nervous and mental hospitals, 344 in the tuberculosis-isolation group and 2,385 in departments of general hospitals. Tuberculosis departments admitted 1,764 children.

In the preventorium group there were 3,304 children admitted: 100 in a federal preventorium for Indians, 413 in seven county preventoriums, 165 in two operated jointly under city and county control, and 2,626 in twenty-one private institutions. The total of 13,400 children admitted in all the tuberculosis institutions represents a decrease of 2,123 since the last report. Tables 27 and 28 contain further information relative to the hospitalization of children.

PATIENTS DISCHARGED

As shown in table 12, the sanatorium and tuberculosis departments discharged 85,620 patients in 1938, transferred 9,361 and reported 22,081 deaths, a total of 117,062 exclusive of discharges in the regular preven-

toriums. The latter did not list discharges but reported 3,304 admissions, which usually approximate the number of patients released. On the assumption, therefore, that the preventoriums discharged 3,304 patients, it is estimated that deaths, transfers and other discharges in tuberculosis institutions reached a total of 120,366. This sum is quite similar to the annual admission rate of 122,342.

The sanatoriums discharged 57,952, transferred 3,314 and listed 12,375 deaths. In the departments, however, the number of transfers was 6,047, discharges 27,668 and deaths 9,706.

Table 10.—Number of Patients Admitted in Tuberculosis Institutions According to States

(Twelve Months Period Ended Sept. 30 or Dec. 31, 1938)

State	Sanatoriums					Departments					Preventoriums	Total Admissions
	Men	Women	Children	Unclassified	Total	Men	Women	Children	Unclassified	Total	Children	
Alabama	158	181	17	202	558	158	6	...	...	164	...	722
Arizona	429	319	191	50	989	838	195	33	201	1,267	185	2,441
Arkansas	321	349	266	...	936	38	28	...	...	66	...	1,002
California	2,251	1,708	478	706	5,143	2,041	864	171	811	3,887	301	9,331
Colorado	457	262	63	84	866	1,703	158	11	74	1,946	...	2,812
Connecticut	654	588	96	...	1,338	141	67	5	2	215	...	1,553
Delaware	50	51	13	...	114	9	8	...	...	17	15	146
District of Columbia	345	307	...	...	652	556	399	16	281	1,252	...	1,904
Florida	423	363	30	36	852	258	172	3	16	449	137	1,438
Georgia	349	378	98	...	825	133	2	...	115	250	...	1,075
Idaho	...	...	203	...	203	29	19	2	...	50	...	253
Illinois	1,816	1,478	611	41	3,946	1,273	812	18	84	2,187	100	6,233
Indiana	557	781	315	338	1,991	137	84	3	...	224	...	2,215
Iowa	314	344	65	...	723	92	36	10	25	163	...	886
Kansas	152	183	151	...	486	227	42	10	39	318	...	804
Kentucky	972	388	159	19	1,538	117	66	6	142	331	...	1,869
Louisiana	241	162	18	...	421	1,363	470	148	...	1,981	...	2,402
Maine	205	253	37	...	495	115	38	...	...	153	...	648
Maryland	730	667	185	...	1,582	113	15	3	...	131	...	1,713
Massachusetts	1,413	1,160	287	8	2,868	477	319	46	43	885	306	4,059
Michigan	1,819	1,392	272	...	3,483	1,552	1,202	182	...	2,936	...	6,419
Minnesota	710	733	81	10	1,534	518	253	46	277	1,094	88	2,716
Mississippi	142	194	1	42	379	5	3	...	106	114	...	493
Missouri	1,049	943	96	...	2,088	425	277	80	21	803	34	2,925
Montana	119	78	11	...	208	111	49	24	...	184	...	392
Nebraska	61	90	24	...	175	57	39	...	67	163	...	338
Nevada	...	...	...	...	...	13	3	22	...	38	...	38
New Hampshire	69	88	20	...	177	...	...	...	...	...	...	177
New Jersey	1,714	1,385	331	...	3,430	976	586	70	174	1,806	628	5,864
New Mexico	421	136	82	...	639	570	164	16	3	753	...	1,392
New York	6,121	4,002	1,192	9	11,324	5,832	3,388	356	44	9,620	491	21,435
North Carolina	905	937	75	1,816	3,733	7	2	...	138	147	...	3,880
North Dakota	151	122	20	...	293	27	18	13	...	58	100	451
Ohio	1,459	1,356	509	244	3,568	977	537	41	195	1,750	295	5,613
Oklahoma	591	702	206	...	1,499	475	131	78	...	684	...	2,183
Oregon	275	244	39	...	558	...	...	...	...	...	...	558
Pennsylvania	1,869	1,804	722	88	4,483	1,479	853	23	130	2,485	231	7,199
Rhode Island	212	152	16	...	380	95	55	3	...	153	125	658
South Carolina	220	214	63	521	1,018	56	37	...	...	93	...	1,111
South Dakota	51	83	4	119	257	50	20	24	...	94	...	351
Tennessee	348	412	205	14	979	185	50	23	6	264	77	1,320
Texas	1,787	1,800	568	172	4,327	726	84	8	32	850	...	5,177
Utah	...	...	...	...	...	44	15	3	...	62	...	62
Vermont	88	73	4	...	165	1	...	...	...	1	106	272
Virginia	456	605	139	460	1,660	174	36	...	20	230	...	1,890
Washington	414	343	85	32	874	401	83	225	26	735	...	1,609
West Virginia	296	302	78	...	676	90	8	3	67	168	...	844
Wisconsin	1,092	911	206	108	2,317	608	146	36	191	981	85	3,383
Wyoming	32	26	...	...	58	19	6	3	...	28	...	86
Totals	34,308	29,049	8,332	5,119	76,808	25,291	11,845	1,764	3,330	42,230	3,304	122,342

Table 11.—Admissions in Tuberculosis Institutions Classified by Control

Control	Sanatoriums					Departments					Preventoriums	Total Admissions
	Men	Women	Children	Unclassified	Total	Men	Women	Children	Unclassified	Total	Children	
Indian Administration	337	319	519	151	1,326	357	394	401	48	1,200	100	2,626
U. S. Army	...	...	...	...	...	1,736	75	6	...	1,817	...	1,817
U. S. Navy	...	...	...	...	...	177	...	...	...	177	...	177
U. S. Public Health Service	166	1	...	...	167	820	15	...	...	835	...	1,002
Veterans Bureau	2,440	29	...	1,760	4,229	4,589	...	...	281	4,870	...	9,099
Other Federal	...	...	...	...	...	200	44	8	18	279	...	279
State	8,971	9,231	2,729	1,028	21,959	2,720	1,608	252	201	4,781	...	26,740
County	9,838	9,167	2,569	1,204	22,778	2,569	1,563	401	1,104	5,637	413	28,828
City	4,530	3,286	1,177	...	8,993	7,959	5,077	229	574	13,839	...	22,832
City-County	1,086	1,029	594	3	2,712	1,194	692	29	...	1,915	165	4,792
Private	6,940	5,987	744	973	14,644	2,961	2,377	438	1,104	6,880	2,626	24,150
Totals	34,308	29,049	8,332	5,119	76,808	25,291	11,845	1,764	3,330	42,230	3,304	122,342

In 1934 there were 16,229 deaths in the sanatoriums and tuberculosis departments as compared to the present report of 22,081. The greater number of institutional deaths at present may be indicative of a growing use of sanatorium facilities for the care of far advanced, terminal cases.

NUMBER OF PATIENTS TREATED

As a further illustration of the scope of tuberculosis hospitalization, tables 13 and 14 have been prepared to show the number and classification of patients treated during to control. It is of further interest to note that 46,036 patients were treated in tuberculosis departments of general hospitals, 6,458 in mental institutions, 6,504 in tuberculosis-isolation hospitals, 481 in orthopedic units and 1,987 in other departments, a total of 61,466.

Data concerning the preventorium division are not complete. However, the reports at hand show 3,322 children treated in the private preventoriums, 469 in the county group, 240 in the city-county division and 163 in the preventorium operated by the Indian Administration, 4,194 in all.

Table 12.—Number of Patients Discharged in Tuberculosis Institutions During 1938 (Classified by States)

State	Sanatoriums				Departments				Preventoriums*	Total Discharges
	Discharges	Transfers	Deaths	Total	Discharges	Transfers	Deaths	Total		
Alabama	417	...	...	417	122	54	42	218	...	635
Arizona	684	...	10	694	949	59	191	1,199	...	1,893
Arkansas	742	...	11	753	38	13	33	84	185	1,022
California	3,513	444	593	4,550	3,580	509	1,155	5,244	...	9,794
Colorado	677	8	140	825	1,895	44	166	2,105	301	3,231
Connecticut	1,170	270	225	1,665	183	59	57	299	...	1,964
Delaware	77	2	39	118	4	...	1	5	...	123
District of Columbia	464	...	116	580	877	215	254	1,346	15	1,941
Florida	219	19	135	373	284	53	124	461	...	834
Georgia	760	...	68	828	88	41	6	135	137	1,100
Idaho	120	3	5	128	37	1	7	45	...	173
Illinois	3,339	156	644	4,139	963	264	878	2,105	...	6,244
Indiana	1,483	12	269	1,764	131	13	79	223	100	2,087
Iowa	519	15	124	658	71	12	19	102	...	760
Kansas	436	...	96	532	201	81	33	315	...	847
Kentucky	1,270	19	221	1,510	136	12	56	204	...	1,714
Louisiana	164	21	109	294	644	50	310	1,004	...	1,298
Maine	413	45	75	533	123	62	30	215	...	748
Maryland	1,360	18	292	1,670	119	37	37	193	...	1,863
Massachusetts	2,254	202	663	3,119	669	76	306	1,051	306	4,476
Michigan	2,744	413	665	3,822	2,036	956	649	3,641	...	7,463
Minnesota	1,337	100	305	1,742	998	134	193	1,325	88	3,155
Mississippi	266	3	76	345	24	...	7	31	...	376
Missouri	1,242	72	386	1,700	384	284	310	978	34	2,712
Montana	161	...	35	196	112	18	44	174	...	370
Nebraska	127	...	27	154	136	7	50	193	...	347
Nevada	...	...	...	...	39	6	7	52	...	52
New Hampshire	143	...	32	175	22	...	2	24	...	199
New Jersey	2,292	40	876	3,208	945	220	595	1,760	628	5,596
New Mexico	421	1	73	495	448	26	88	562	...	1,057
New York	8,579	618	2,086	11,283	5,140	1,371	2,015	8,526	491	20,300
North Carolina	2,844	109	485	3,438	5	5	8	18	...	3,456
North Dakota	269	...	40	309	40	16	8	64	100	473
Ohio	2,788	150	625	3,563	1,338	599	389	2,326	295	6,184
Oklahoma	1,272	3	174	1,449	497	37	81	615	...	2,064
Oregon	456	68	90	614	...	...	...	...	...	614
Pennsylvania	3,462	273	749	4,484	1,468	119	886	2,473	231	7,188
Rhode Island	199	1	97	297	80	10	50	140	125	562
South Carolina	658	...	149	807	85	28	11	124	...	931
South Dakota	158	...	22	180	82	16	16	114	...	294
Tennessee	487	4	223	714	180	92	31	303	77	1,094
Texas	3,753	25	335	4,113	651	50	133	834	...	4,947
Utah	...	...	...	...	35	5	19	59	...	59
Vermont	143	...	44	187	24	...	3	27	106	320
Virginia	1,272	6	320	1,598	101	40	66	207	...	1,805
Washington	748	18	154	920	804	49	128	981	...	1,901
West Virginia	418	3	93	514	91	49	14	154	...	668
Wisconsin	1,573	173	371	2,117	774	246	114	1,134	85	3,336
Wyoming	59	...	8	67	15	9	5	29	...	96
Totals	57,952	3,314	12,375	73,641	27,668	6,047	9,706	43,421	3,304	120,366

* Admissions in lieu of discharges.

during a twelve months period. The impressive total of 202,021 treated in 1938 agrees closely with the estimate of 203,436 obtained in the previous survey, when 82 per cent of the institutions reported 166,818 patients treated.

The sanatoriums now show a total of 136,361 patients treated, the departments 61,466 and the preventoriums 4,194. In this group are 96,924 men, 69,840 women, 21,324 children and 13,933 unclassified. The private institutions treated 36,211, the federal hospitals 22,046 and the remaining tax-supported institutions 143,764. Reference should be made to table 14 for information concerning the number of patients treated in the various institutions, all of which have been classified according

DAILY CENSUS

In the 1935 report it was shown that 81,652 patients were under treatment in tuberculosis institutions on the day of reporting and that the average daily census was 81,952 on the basis of 69,024 patients in institutions, representing 83.8 per cent of the total bed capacity. The present report shows 79,679 patients present at the beginning of the year, 79,300 as the average daily census and 80,403 under treatment at the end of the twelve months period.

Table 15 indicates an average daily census of 61,288 in the sanatorium group, 17,122 in the tuberculosis departments and 890 in the preventoriums. Federal institutions reported an average daily census of 6,766,

state 22,501, county 22,342, city 12,337, city-county 3,065 and private institutions 12,289. For corresponding data concerning the sanatoriums, tuberculosis departments and preventoriums, reference should be made to table 16.

In the group of tuberculosis departments the general hospitals reported an average census of 10,119, mental institutions 3,858, tuberculosis-isolation hospitals 2,448, orthopedic units 207 and other hospitals 490 (table 17). The number of patients present in the sanatoriums, tuberculosis departments and preventoriums at the beginning of the year is shown in table 18.

AVERAGE LENGTH OF STAY

Information concerning the average length of stay was furnished by 456 sanatoriums which reported

Table 13.—Patients Treated in Tuberculosis Institutions During Year

State	Sanatoriums					Departments					Preventoriums	Grand Total
	Men	Women	Children	Unclassified	Total	Men	Women	Children	Unclassified	Total	Children	
Alabama	221	241	30	292	784	256	6	...	...	262	...	1,046
Arizona	646	438	253	50	1,387	1,114	211	33	322	1,680	185	3,252
Arkansas	601	698	366	...	1,665	80	42	...	...	122	...	1,787
California	4,132	3,166	982	707	8,987	2,680	1,189	351	1,497	5,717	461	15,165
Colorado	1,006	569	119	84	1,778	2,160	231	12	251	2,654	...	4,432
Connecticut	1,333	1,161	396	...	2,890	179	70	5	112	366	...	3,256
Delaware	121	119	45	...	285	9	8	...	...	17	35	337
District of Columbia	557	489	...	...	1,046	698	466	16	310	1,490	...	2,536
Florida	710	615	30	36	1,391	349	243	4	35	631	137	2,159
Georgia	554	595	246	...	1,395	149	2	...	115	266	...	1,661
Idaho	...	...	280	...	280	39	33	2	1	75	...	355
Illinois	3,260	2,682	782	225	6,949	2,160	1,311	30	105	3,606	100	10,655
Indiana	1,006	1,315	438	527	3,286	245	115	6	...	366	...	3,652
Iowa	587	686	98	153	1,524	137	71	10	27	245	...	1,769
Kansas	314	421	185	...	920	291	61	12	39	403	...	1,323
Kentucky	1,497	680	269	19	2,465	136	73	6	305	520	...	2,985
Louisiana	354	270	25	...	649	1,664	592	148	...	2,404	...	3,053
Maine	385	508	66	...	959	169	84	3	...	256	...	1,215
Maryland	1,255	1,133	398	11	2,797	357	76	3	2	438	...	3,235
Massachusetts	2,677	2,355	753	112	5,897	900	599	56	69	1,624	358	7,879
Michigan	2,941	2,385	379	764	6,469	2,388	1,860	213	154	4,615	...	11,084
Minnesota	1,543	1,621	149	10	3,323	875	458	54	277	1,664	163	5,150
Mississippi	255	334	2	42	633	27	18	...	106	151	...	784
Missouri	1,710	1,688	129	...	3,527	552	370	94	21	1,037	34	4,598
Montana	244	144	21	...	409	133	57	27	5	222	...	631
Nebraska	108	145	52	...	305	117	91	3	67	278	...	583
Nevada	...	...	...	...	...	16	4	27	...	47	...	47
New Hampshire	149	170	43	...	362	...	...	...	...	...	...	362
New Jersey	3,101	2,514	591	2	6,208	1,466	1,015	140	199	2,820	847	9,875
New Mexico	770	215	161	...	1,146	780	191	17	48	1,045	...	2,191
New York	10,946	7,147	2,334	294	20,721	8,171	5,127	492	322	14,112	559	35,392
North Carolina	2,117	1,498	169	1,984	5,768	7	2	...	138	147	...	5,915
North Dakota	280	299	40	...	619	29	19	14	...	62	163	844
Ohio	2,754	2,552	1,016	245	6,567	1,109	647	49	698	2,503	335	9,405
Oklahoma	885	1,067	322	...	2,274	541	140	100	...	781	...	3,055
Oregon	544	494	77	...	1,115	...	...	...	4	4	...	1,119
Pennsylvania	3,513	3,274	1,332	91	8,210	2,095	1,295	41	162	3,593	311	12,114
Rhode Island	441	344	46	...	831	127	70	3	47	247	168	1,246
South Carolina	330	345	114	862	1,651	76	66	...	...	142	...	1,793
South Dakota	163	202	4	205	574	70	22	30	...	122	...	696
Tennessee	665	806	431	16	1,918	195	55	23	6	279	77	2,274
Texas	2,614	2,622	648	176	6,060	782	109	8	287	1,186	...	7,246
Utah	...	...	...	...	...	64	25	3	21	113	...	113
Vermont	141	127	4	...	272	2	...	...	...	2	176	450
Virginia	825	1,000	200	794	2,819	308	114	...	20	442	...	3,261
Washington	765	645	141	63	1,614	702	198	417	26	1,343	...	2,957
West Virginia	627	646	138	...	1,411	97	8	3	67	175	...	1,586
Wisconsin	1,938	1,764	330	108	4,140	752	164	37	196	1,149	85	5,374
Wyoming	45	36	...	...	81	32	7	4	...	43	...	124
Totals	61,630	52,225	14,634	7,872	136,361	35,294	17,615	2,496	6,061	61,466	4,194	202,021

Table 14.—Number of Patients Treated in Tuberculosis Institutions Classified by Control.

Control	Sanatoriums					Departments					Preventoriums	Grand Total
	Men	Women	Children	Unclassified	Total	Men	Women	Children	Unclassified	Total	Children	
Indian Administration	470	495	760	337	2,062	403	428	614	74	1,519	163	3,744
U. S. Army	...	...	...	...	...	2,131	106	6	20	2,263	...	2,263
U. S. Navy	...	...	...	...	...	300	...	...	...	300	...	300
Public Health Service	342	3	...	...	345	1,222	19	...	...	1,241	...	1,586
Veterans Bureau	4,786	84	...	1,760	6,630	6,443	...	...	692	7,135	...	13,765
Other Federal	...	...	...	...	...	286	76	8	18	388	...	388
State	16,125	16,633	5,036	2,119	39,913	4,953	3,711	282	802	9,748	...	49,661
County	18,505	17,237	4,928	1,573	42,243	3,970	2,651	733	1,232	8,586	469	51,298
City	8,049	5,919	1,782	853	16,603	10,402	6,731	284	984	18,401	...	35,004
City-County	1,881	1,870	919	5	4,675	1,455	865	73	493	2,886	240	7,801
Private	11,472	9,984	1,209	1,225	23,890	3,729	3,028	496	1,746	8,999	3,322	36,211
Totals	61,630	52,225	14,634	7,872	136,361	35,294	17,615	2,496	6,061	61,466	4,194	202,021

22,370,120 treatment days and a total of 136,361 patients treated. Hence the average number of days per patient is 164 as compared to 166 in the previous report. Three hundred and ten tuberculosis departments gave 6,249,530 treatment days to 61,466 patients. This indicates an average stay of 101 days, the identical figure reported in 1935.

Incomplete reports from the preventoriums would indicate an average length of stay of seventy-seven days on the basis of 4,194 patients treated and 324,850 treatment days. The returns were likewise incomplete in 1935, when estimates ranging from seventy-nine to eighty-four days were made.

Tables 19 and 20 refer to the average stay in sanatoriums classified by states and according to control. In the federal sanatoriums the average is 138 days, in state sanatoriums 170, county 171, municipal 175, city-county 156 and private 147. The corresponding figures for 1934 were 172, 166, 173, 170, 165 and 151 respectively.

The average length of stay in the sanatorium group is apparently decreasing as a result of continuing improvements in the medical and surgical therapy of tuberculosis. It may eventually increase, however, when the sanatoriums begin to realize their full responsibility in the rehabilitation of patients. Then the period of hospitalization will no doubt be extended to include suitable programs of graduated exercise and courses of vocational training now lacking in most of the institutions. A well balanced sanatorium service is one that gives due consideration not only to prevention and therapy but also to rehabilitative measures that may prevent a further reactivation of the disease. As the incidence of tuberculosis decreases it is logical to assume that further emphasis will be placed on the continued hospitalization of far advanced cases especially in states in which there may be an adequate number of tuberculosis beds. This method of protective isolation should also tend to increase the average length of hospitalization.

Table 15.—Average Daily Census in Tuberculosis Institutions by States

State	Sanatoriums					Departments					Preventoriums	
	Men	Women	Children	Unclassified	Total	Men	Women	Children	Unclassified	Total	Children	Grand Total
Alabama	80	87	12	71	250	90	...	...	1	91	...	341
Arizona	213	122	85	49	469	281	17	1	113	412	...	881
Arkansas	243	360	96	...	699	42	14	...	...	56	...	755
California	1,676	1,496	491	460	4,123	537	249	68	809	1,663	160	5,946
Colorado	341	219	7	381	948	48	19	4	219	290	...	1,238
Connecticut	621	530	333	56	1,540	36	11	...	2	49	...	1,589
Delaware	79	71	23	...	173	...	...	...	...	...	20	193
District of Columbia	265	250	...	...	515	178	102	...	8	288	...	803
Florida	194	197	22	80	493	65	41	1	40	147	...	640
Georgia	122	145	39	235	541	9	...	...	...	9	...	550
Idaho	...	...	125	...	125	9	13	1	1	24	...	149
Illinois	1,382	1,134	138	510	3,164	636	297	10	106	1,049	...	4,213
Indiana	359	454	97	398	1,308	115	25	...	...	140	...	1,448
Iowa	295	369	30	64	758	7	...	...	2	9	...	767
Kansas	131	213	34	45	423	69	18	2	2	91	...	514
Kentucky	507	305	110	...	922	16	1	...	168	185	...	1,107
Louisiana	122	111	11	...	244	113	...	...	283	396	...	640
Maine	188	246	20	...	454	53	45	3	...	101	...	555
Maryland	540	468	208	...	1,216	109	5	...	188	302	...	1,518
Massachusetts	1,113	1,038	385	531	3,067	218	191	7	100	516	52	3,635
Michigan	923	708	59	1,432	3,122	730	582	42	141	1,495	...	4,617
Minnesota	805	864	54	60	1,783	331	186	3	77	597	75	2,455
Mississippi	12	13	...	254	279	...	...	...	...	....	...	279
Missouri	669	758	34	155	1,616	48	18	7	197	270	...	1,886
Montana	127	66	10	...	203	17	9	4	5	35	...	238
Nebraska	50	71	33	...	154	51	45	...	10	106	...	260
Nevada	...	...	...	...	...	...	1	...	...	1	...	1
New Hampshire	79	93	18	...	190	...	...	...	...	...	...	190
New Jersey	1,411	1,137	318	30	2,896	326	278	71	316	991	219	4,106
New Mexico	278	41	42	131	492	225	24	...	45	294	...	786
New York	4,228	3,012	960	1,387	9,587	2,518	1,544	139	159	4,360	68	14,015
North Carolina	415	469	69	1,151	2,104	...	...	...	...	...	...	2,104
North Dakota	137	164	12	...	313	1	1	...	1	3	63	379
Ohio	1,204	1,069	291	477	3,041	38	11	4	156	209	40	3,290
Oklahoma	275	390	68	64	797	97	5	23	39	164	...	961
Oregon	241	255	45	...	541	...	...	...	4	4	...	545
Pennsylvania	1,682	1,536	634	...	3,852	659	415	5	86	1,165	80	5,097
Rhode Island	274	227	...	...	501	...	...	...	45	45	43	589
South Carolina	124	131	54	386	695	19	25	...	...	44	...	739
South Dakota	64	84	...	101	249	20	...	...	61	81	...	330
Tennessee	205	273	127	345	950	10	4	3	...	17	...	967
Texas	813	701	80	102	1,696	38	7	...	276	321	...	2,017
Utah	...	...	...	...	...	...	...	...	40	40	...	40
Vermont	58	52	...	...	110	1	...	...	...	1	70	181
Virginia	191	178	24	736	1,129	141	80	...	...	221	...	1,350
Washington	213	213	41	226	693	379	11	168	58	616	...	1,309
West Virginia	336	403	77	24	840	5	...	...	...	5	...	845
Wisconsin	912	921	66	98	1,997	184	17	...	5	206	...	2,203
Wyoming	12	14	...	...	26	12	...	...	1	13	...	39
Totals	24,209	21,658	5,382	10,039	61,288	8,481	4,311	566	3,764	17,122	800	79,300

THE WAITING LIST

The sanatoriums reported 7,572 patients on the waiting list, the tuberculosis departments 1,225, a total of 8,797 as compared to 9,854 in 1935. There were 198 tuberculous patients awaiting admission to Veterans' hospitals, 180 to hospitals of the Indian Administration, 900 to private institutions and 7,519 to the remaining tax-supported institutions: state 5,106, county 1,368, city-county 329 and municipal 716.

Tuberculosis departments in general hospitals reported 888 patients awaiting admission, tuberculosis-isolation hospitals 313 and other departments twenty-four, a total of 1,225.

It is apparent that the present waiting list is largely the result of unequal distribution, since the number of vacant beds, 16,254 in all, exceeds the number of applications now pending by 7,457. As shown in table 21, there are 9,577 vacancies in the sanatoriums, 2,005 more than the number of patients awaiting hospitalization in this group. In the state and city-county sanatoriums, however, the waiting list is considerably greater than the number of vacancies. Vacant beds in the tuberculosis departments total 6,677, or 5,452 more than the number of patients now applying for admission. It should be noted, however, that the municipal departments have a waiting list nearly twice the number of vacancies.

CONDITION OF PATIENTS ON ADMISSION

In the present survey 427 sanatoriums and 345 tuberculosis departments reported on the condition of patients on admission. As shown in table 22, there are 97,632 patients included in this study: 6,081 first infection type, 10,301 minimal pulmonary tuberculosis, 25,740 moderately advanced, 44,047 far advanced, 4,678 nonpulmonary forms and 6,785 others.

From these data it is apparent that approximately 7 per cent of the patients are nontuberculous, while 93 per cent have some form of tuberculous infection. Of the cases of tuberculosis, 90,847 in all, 6.7 per cent were classified as first infection type, 5.1 per cent as nonpulmonary forms and 88.2 per cent as frank pulmonary tuberculosis. In previous reports the corresponding figures were 8.7, 4.1 and 87 per cent respectively, while in 1931 the National Tuberculosis Association reported 8, 4 and 88 per cent.

Pulmonary cases of the reinfection type totaled 80,088. Of these 12.9 per cent were admitted in the minimal stage, 32.1 per cent as moderately advanced and 55 per cent as far advanced. The report of 1935 showed corresponding ratios of 13.1, 29.7 and 57.2 per cent and the National Tuberculosis Association reported 16, 30 and 54 per cent in 1931. Since 1931 the percentage of early diagnoses has decreased from 16 to 12.9 per cent. This may represent only a relative decline, however, in view of the increasing use of sanatorium facilities for segregation of advanced, infectious cases of pulmonary tuberculosis. Formerly a number of sanatoriums attempted to limit their admissions to early cases but advances in treatment and a fuller realization of the importance of isolation as a control measure have helped to eliminate restrictions of this type.

A decrease in the percentage of first infection type of disease has apparently occurred, although it should be noted that 3,304 unclassified admissions to the preventorium group were not included in the foregoing study. Obviously, it would not have been accurate to assume that all these children were of the first infection type. Previous reports show that preventoriums have accepted not only the first infection type of tuberculosis but also nontuberculous patients, extra-pulmonary cases and occasionally the adult type of disease.

Table 16.—Average Daily Census in Tuberculosis Institutions by Control

	Sanatoriums					Departments					Preventoriums	
Control	Men	Women	Children	Unclassified	Total	Men	Women	Children	Unclassified	Total	Children	Grand Total
Indian Administration	100	133	240	367	840	26	28	173	55	282	63	1,185
U. S. Army	...	...	...	...	...	33	1	...	8	42	...	42
U. S. Navy	...	...	...	...	...	100	...	...	...	100	...	100
Public Health Service	171	2	...	...	173	351	5	...	56	412	...	585
Veterans Bureau	908	7	...	1,483	2,398	1,946	...	...	399	2,345	...	4,743
Other Federal	...	...	...	...	...	69	29	...	13	111	...	111
State	7,028	7,275	1,981	2,261	18,545	1,475	1,430	27	1,024	3,956	...	22,501
County	7,876	7,374	2,005	2,531	19,786	1,350	775	226	454	2,805	56	22,342
City	3,451	2,603	534	1,372	7,960	2,379	1,460	35	503	4,377	...	12,337
City-County	646	583	186	580	1,995	237	148	43	567	995	75	3,065
Private	4,029	3,681	436	1,445	9,591	515	435	62	685	1,697	696	12,289
Totals	24,209	21,658	5,382	10,039	61,288	8,481	4,311	566	3,764	17,122	890	79,300

Table 17.—Average Daily Census in Tuberculosis Departments According to Type

Type	Men	Women	Children	Unclassified	Total
General	5,236	1,778	453	2,652	10,119
Mental	1,724	1,591	8	535	3,858
Tb-Isolation	1,242	815	87	304	2,448
Orthopedic	78	112	17	...	207
All Other Hospitals	201	15	1	273	490
Totals	8,481	4,311	566	3,764	17,122

DIAGNOSTIC AND THERAPEUTIC FACILITIES

Tables 23 and 24 contain information concerning x-ray and laboratory departments, pneumothorax facilities and outpatient clinics in the tuberculosis departments and sanatoriums. From these data it would appear that the use of collapse therapy is steadily increasing, since 442 sanatoriums and 328 tuberculosis departments report facilities for artificial pneumothorax at present as compared to 406 sanatoriums and 101 departments in 1935. It is likewise encouraging to note that 361 sanatoriums and 222 departments have made further arrangements for the administration of collapse therapy in the outpatient clinics. All the federal sanatoriums have facilities for pneumothorax, sixty-seven state sanatoriums, 173 county, eighteen city, fourteen city and county and 151 private. Increases are noted in all these divisions except the municipal group, which reported the same number in 1935. Tuberculosis departments are likewise extending the use of collapse therapy, as evidenced by the presence of pneumothorax equipment in 237 general hospitals, thirty-nine mental institutions, twenty tuberculosis-isolation hospitals, one

orthopedic unit and twenty-seven other departments. Special arrangements for an outpatient pneumothorax service have also been made in 189 departments of general hospitals, six mental institutions, fifteen tuberculosis-isolation hospitals, one orthopedic department and ten other units.

X-ray departments are now furnished in 410 sanatoriums and 568 tuberculosis departments, whereas in 1935 there were 368 sanatoriums in which roentgenographic or fluoroscopic facilities were available. All the federal sanatoriums have x-ray departments, also sixty-eight state sanatoriums, 166 county, nineteen city, twelve city-county and 126 private. Three hundred and three indicated that physicians were in charge of the roentgenologic service. Reference to table 24 will show a similar classification of the x-ray services in the tuberculosis departments, where 509 physicians were reported in charge. In the group of tuberculosis departments are 412 general hospitals that have roentgenologic equipment, eighty-six mental institutions, eighteen tuberculosis-isolation hospitals, eight orthopedic services and forty-three other departments.

In 1935 there were 346 sanatoriums that performed sputum examinations, 349 had facilities for blood counts and 378 had equipment for urinalysis. In the present survey 364 sanatoriums reported laboratory departments and physicians in charge in 224. Laboratory units were also present in 558 tuberculosis departments with 479 under medical supervision. The classification of laboratories by states and control will be found in tables 23 and 24. It can be added, however, that 403 tuberculosis departments in general hospitals have laboratory facilities, eighty-two in mental institutions, eighteen in tuberculosis-isolation hospitals and fifty-four in other departments including seven orthopedic units.

Table 18.—Census of Patients in Tuberculosis Institutions at Beginning of Year (by States)

State	Sanatoriums					Departments					Preventoriums	Grand Total
	Men	Women	Children	Unclassified	Total	Men	Women	Children	Unclassified	Total	Children	
Alabama	63	60	13	90	226	98	...	...	...	98	...	324
Arizona	217	119	62	...	398	276	16	...	121	413	...	811
Arkansas	280	349	100	...	729	42	14	...	...	56	...	785
California	1,881	1,458	504	1	3,844	639	325	180	686	1,830	160	5,834
Colorado	549	307	56	...	912	457	73	1	177	708	...	1,620
Connecticut	679	573	300	...	1,552	38	3	...	110	151	...	1,703
Delaware	71	68	32	...	171	...	...	...	...	...	20	191
District of Columbia	212	182	...	...	394	142	67	...	29	238	...	632
Florida	287	252	...	...	539	91	71	1	19	182	...	721
Georgia	205	217	148	...	570	16	...	...	...	16	...	586
Idaho	...	...	77	...	77	10	14	...	1	25	...	102
Illinois	1,444	1,204	171	184	3,003	887	499	12	21	1,419	...	4,422
Indiana	449	534	123	189	1,295	108	31	3	...	142	...	1,437
Iowa	273	342	33	153	801	45	35	...	2	82	...	883
Kansas	162	238	34	...	434	64	19	2	...	85	...	519
Kentucky	525	292	110	...	927	19	7	...	163	189	...	1,116
Louisiana	113	108	7	...	228	301	122	...	...	423	...	651
Maine	180	255	29	...	464	54	46	3	...	103	...	567
Maryland	525	466	213	11	1,215	244	61	...	2	307	...	1,522
Massachusetts	1,264	1,195	466	104	3,029	423	280	10	26	739	52	3,820
Michigan	1,122	993	107	764	2,986	836	658	31	154	1,679	...	4,665
Minnesota	833	888	68	...	1,789	357	205	8	...	570	75	2,434
Mississippi	113	140	1	...	254	22	15	...	...	37	...	291
Missouri	661	745	33	...	1,439	127	93	14	...	234	...	1,673
Montana	125	66	10	...	201	22	8	3	5	38	...	239
Nebraska	47	55	28	...	130	60	52	3	...	115	...	245
Nevada	...	...	...	...	...	3	1	5	...	9	...	9
New Hampshire	80	82	23	...	185	...	...	...	...	...	...	185
New Jersey	1,587	1,129	260	2	2,778	490	429	70	25	1,014	219	4,011
New Mexico	349	79	79	...	507	219	27	1	45	292	...	799
New York	4,825	3,145	1,142	285	9,397	2,339	1,739	136	278	4,492	68	13,957
North Carolina	1,212	561	94	168	2,035	...	...	...	...	...	...	2,035
North Dakota	129	177	20	...	326	2	1	1	...	4	63	393
Ohio	1,295	1,196	507	1	2,999	132	110	8	503	753	40	3,792
Oklahoma	294	365	116	...	775	66	9	22	...	97	...	872
Oregon	269	250	38	...	557	...	...	...	4	4	...	561
Pennsylvania	1,644	1,470	610	3	3,727	616	442	18	32	1,108	80	4,915
Rhode Island	229	192	30	...	451	32	15	...	47	94	43	588
South Carolina	110	131	51	341	633	20	29	...	...	49	...	682
South Dakota	112	119	...	86	317	20	2	6	...	28	...	345
Tennessee	317	394	226	2	939	10	5	...	...	15	...	954
Texas	827	822	80	4	1,733	56	25	...	255	336	...	2,069
Utah	...	...	...	...	...	20	10	...	21	51	...	51
Vermont	53	54	...	...	107	1	...	...	...	1	70	178
Virginia	369	395	61	334	1,159	134	78	...	...	212	...	1,371
Washington	351	302	56	31	740	301	115	192	...	608	...	1,348
West Virginia	331	344	60	...	735	7	...	...	...	7	...	742
Wisconsin	846	853	124	...	1,823	144	18	1	5	168	...	1,991
Wyoming	13	10	...	...	23	13	1	1	...	15	...	38
Totals	27,322	23,176	6,302	2,753	59,553	10,003	5,770	732	2,731	19,236	890	79,679

Community service in the form of outpatient tuberculosis clinics is now provided in 264 sanatoriums and 259 tuberculosis departments. Nineteen of the sanatoriums and thirteen of the departments report traveling or field clinics, yet it is not certain from the data supplied that the field clinics of the departments are in all instances associated with the tuberculosis service. Ten federal sanatoriums conduct tuberculosis clinics, forty-eight state, 126 county, nine municipal, nine city-county and sixty-two private sanatoriums.

NURSING PERSONNEL IN TUBERCULOSIS SANATORIUMS

Four hundred and fifty sanatoriums representing 69,330 beds and an average daily census of 60,511 reported 5,054 registered nurses employed, 1,223

unregistered nurses, 673 students and 4,389 attendants. Practical nurses are apparently included in both the unregistered and the attendant groups.

Further reference should be made to tables 25 and 26 showing nursing personnel in the tuberculosis sanatoriums classified by states and according to control. The number of nurses and attendants has also been included in the list of sanatoriums accompanying this report. The employment of students, including affiliates and postgraduate nurses, was reported by the following sanatoriums:

1. Arroyo-Del Valle Sanatorium, Livermore, Calif.
2. Barlow Sanatorium, Los Angeles.
3. Pauling Rest Home, San Fernando, Calif.
4. Santa Clara County Sanatorium, San Jose, Calif.
5. Expatients' Tubercular Home, Denver.
6. Wildwood Sanatorium, Hartford, Conn.
7. William Wirt Winchester Hospital, West Haven, Conn.
8. The Outlook, Urbana, Ill.
9. Broadlawns, Polk County Public Hospital (Tuberculosis Department), Des Moines, Iowa.
10. Bangor Sanatorium, Bangor, Me.
11. Maryland Tuberculosis Sanatorium, Henryton, Md.
12. Maryland Tuberculosis Sanatorium, State Sanatorium, Md.
13. Hospital for Consumptives, Towson, Md.
14. Sanatorium Division of Boston City Hospital, Boston.
15. Rutland State Sanatorium, Rutland, Mass.
16. Rutland Training Center, Rutland, Mass.
17. Plymouth County Hospital, South Hanson, Mass.
18. Glen Lake Sanatorium, Oak Terrace, Minn.
19. Pokegama Sanatorium, Pokegama, Minn.
20. Mississippi State Tuberculosis Sanatorium, Sanatorium, Miss.
21. Mount St. Rose Sanatorium, St. Louis.
22. Hospital for the Tuberculous, Kearney, Neb.
23. Lakeland Sanatorium, Grenloch, N. J.
24. Hermann M. Biggs Memorial Hospital, Ithaca, N. Y.
25. Homer Folks Tuberculosis Hospital, Oneonta, N. Y.
26. Sea View Hospital, Staten Island, N. Y.
27. North Carolina Sanatorium for the Treatment of Tuberculosis, Sanatorium, N. C.
28. Hamilton County Tuberculosis Sanatorium, Cincinnati.
29. Eastern Oregon State Tuberculosis Hospital, The Dalles, Ore.
30. Beaver County Sanatorium, Monaca, Pa.
31. White Haven Sanatorium, White Haven, Pa.
32. State Tuberculosis Sanatorium, Sanatorium, Texas.
33. Piedmont Sanatorium, Burkeville, Va.
34. Catawba Sanatorium, Catawba Sanatorium, Va.
35. Blue Ridge Sanatorium, Charlottesville, Va.
36. King County Tuberculosis Hospital, Seattle, Wash.
37. Laurel Beach Sanatorium, Seattle, Wash.
38. Riverton Sanatorium, Seattle, Wash.
39. Muirdale Sanatorium, Wauwatosa, Wis.

HOSPITALIZATION OF CHILDREN

The survey of 1935 showed a total of 11,647 beds for children: 9,036 in the sanatoriums, 944 in the tuberculosis departments and 1,667 in the preventoriums.

Table 19.—Average Length of Stay in Tuberculosis Sanatoriums According to Control

Control	Patients Treated	Treatment Days	Average Stay (1938)	Average Stay (1934)
Federal	9,037	1,245,015	138	172
State	39,913	6,768,925	170	166
County	42,243	7,221,890	171	173
City	16,603	2,905,400	175	170
City-County	4,675	728,175	156	165
Private	23,890	3,500,715	147	151
	136,361	22,370,120	164	166

These figures are nearly identical with the present report of 11,717 beds, including 2,144 in the regular preventoriums, 8,285 in the sanatoriums and 1,288 in the tuberculosis departments. In all there were 169 sanatoriums, eighty-one tuberculosis departments and thirty-one preventoriums that reported beds available for the care of children. Included in the present bed capacity for children are 657 in federal hospitals, 2,467 in private institutions and 8,593 in the remaining tax-supported hospitals: state 3,014, county 3,570, municipal 1,308 and city-county 701. A similar classification of beds in the sanatoriums, tuberculosis departments and preventoriums can be found in tables 27 and 28.

From the standpoint of bed capacity alone, it would appear that the tuberculosis service for children has remained practically unchanged. Reference to the present census reports, however, will show that the annual admissions have decreased 2,123 since the previous survey, when the sanatoriums admitted 10,394 children, the tuberculosis departments 1,031 and the preventoriums 4,098. From the reports of 251 sanatoriums, 167 tuberculosis departments and thirty-one preventoriums that accepted children for hospital care in 1938 it can be shown that a total of 13,400 children were admitted, 21,324 treated and 12,172 discharged. At the beginning of the year there were 7,924 patients pres-

Table 20.—Average Length of Stay in Tuberculosis Sanatoriums by States

State	Patients Treated	Treatment Days	Average Stay
Alabama	784	91,250	116
Arizona	1,387	171,185	123
Arkansas	1,665	255,135	153
California	8,987	1,504,895	167
Colorado	1,778	346,020	194
Connecticut	2,890	562,100	194
Delaware	285	63,145	221
District of Columbia	1,046	187,975	180
Florida	1,391	179,945	129
Georgia	1,395	197,465	141
Idaho	280	45,625	163
Illinois	6,949	1,154,860	166
Indiana	3,286	477,420	145
Iowa	1,524	276,670	181
Kansas	920	154,395	167
Kentucky	2,465	336,530	136
Louisiana	649	89,060	137
Maine	959	165,710	172
Maryland	2,797	443,840	158
Massachusetts	5,897	1,119,455	190
Michigan	6,469	1,139,530	176
Minnesota	3,323	650,795	195
Mississippi	633	101,835	160
Missouri	3,527	589,840	167
Montana	409	74,095	181
Nebraska	305	56,210	184
New Hampshire	362	69,350	191
New Jersey	6,208	1,057,040	170
New Mexico	1,146	179,580	157
New York	20,721	3,499,255	169
North Carolina	5,768	767,960	133
North Dakota	619	114,245	184
Ohio	6,567	1,109,965	169
Oklahoma	2,274	290,905	128
Oregon	1,115	197,465	177
Pennsylvania	8,210	1,405,980	171
Rhode Island	831	182,865	220
South Carolina	1,651	253,675	154
South Dakota	574	90,885	158
Tennessee	1,918	346,750	180
Texas	6,060	619,040	102
Vermont	272	40,150	147
Virginia	2,819	412,085	146
Washington	1,614	252,945	157
West Virginia	1,411	306,600	217
Wisconsin	4,140	728,905	176
Wyoming	81	9,490	117
Totals	136,361	22,370,120	164

Table 21.—Waiting List in Tuberculosis Institutions

Control	Sanatoriums		Departments		Totals	
	Vacancies	Waiting List	Vacancies	Waiting List	Vacancies	Waiting List
Indian Administration	235	137	245	43	480	180
Veterans Bureau	234	90	706	108	940	198
Other Federal	36	...	838	...	874	...
State	2,177	4,992	2,537	114	4,714	5,106
County	2,685	1,095	1,127	273	3,812	1,368
City	478	207	283	509	761	716
City-County	195	301	149	28	344	329
Private	3,537	750	792	150	4,329	900
Totals	9,577	7,572	6,677	1,225	16,254	8,797

ent; however, the average daily census was only 6,838. Admissions classified by control show the following distribution: federal 1,034, state 2,981, county 3,383, city 1,406, city-county 788, private 3,808. Similar data concerning the number of patients treated and the average daily census are included in table 28.

The sanatoriums admitted 8,332 children, discharged 7,500, treated 14,634 and maintained an average daily census of 5,382. The census at the beginning of the year was 6,302, at the end of the twelve months period 5,789. In the tuberculosis departments there were 1,764 children admitted, 2,496 treated and 1,368 discharged. The census averaged 566. It was 710 on the first day of the year, 640 on the last day. The preventoriums, which had a daily census of 890, admitted 3,304 and treated 4,194.

The institutions classified as preventoriums furnish less than half of the facilities now devoted to preventorium care. They have 2,144 beds, whereas the sanatoriums provide 2,447 and the tuberculosis departments 239. Accordingly there are at present 4,830 beds for preventorium purposes in thirty-one regular preventoriums, fifty-five sanatoriums and thirteen tuberculosis departments. It is apparent that additional preventorium beds are available, however, since patients with the first infection type of disease were reported in 167 of the sanatoriums that admit children. A total of 161 sanatoriums accepted "childhood" tuberculosis in 1934. In reporting on the condition of patients on admission, the sanatoriums listed 5,396 under the first infection type, the tuberculosis departments 685. It should be taken into consideration that adults with the first infection type are also included in these figures.

In recent years a number of institutions have discontinued their preventorium units in order to expand the regular sanatorium service. This would seem a logical procedure in view of the fact that the isolation of patients with open pulmonary tuberculosis has proved a more effective means of tuberculosis prevention and control than the hospitalization of tuberculous contacts and children with the first infection type of disease.

Table 22.—Condition of Patients on Admission

State	Sanatoriums								Departments							
	Number Reporting	First Infection	Minimal	Moderately Advanced	Far Advanced	Non-Pulmonary	Other	Total	Number Reporting	First Infection	Minimal	Moderately Advanced	Far Advanced	Non-Pulmonary	Other	Total
Alabama	6	15	30	206	283	7	8	549	2	1	10	40	70	6	2	129
Arizona	13	148	147	298	247	61	73	974	10	13	4	103	358	12	4	494
Arkansas	2	235	89	54	454	10	4	846	3	..	2	2	74	..	..	78
California	32	306	499	1,243	1,862	84	316	4,310	26	95	175	701	622	92	37	1,722
Colorado	12	33	64	155	380	20	108	760	10	17	46	223	181	23	..	490
Connecticut	8	36	141	340	666	59	97	1,339	3	4	5	3	8	3	..	23
Delaware	2	4	13	35	52	1	9	114	..	..	...	...	...	..	..	...
District of Columbia	1	96	52	133	322	9	8	620	3	13	60	271	426	38	38	846
Florida	4	33	41	93	478	6	38	689	7	14	10	90	103	3	8	228
Georgia	4	45	57	207	450	96	61	916	3	..	2	21	62	1	22	108
Idaho	1	153	22	24	4	8	...	211	3	4	11	24	12	..	..	51
Illinois	24	130	351	594	2,056	495	262	3,888	14	22	104	330	1,484	44	20	2,004
Indiana	10	292	222	331	738	76	200	1,859	5	..	11	54	120	14	..	199
Iowa	6	15	79	149	395	44	41	723	4	..	6	13	7	..	..	26
Kansas	2	11	21	84	140	1	126	383	7	4	45	79	83	9	..	220
Kentucky	4	156	50	317	920	52	24	1,519	6	21	10	63	29	10	4	137
Louisiana	4	18	31	76	183	23	6	337	5	..	158	580	672	183	..	1,593
Maine	4	39	43	86	227	9	81	485	5	4	28	20	20	3	14	89
Maryland	6	111	270	401	654	22	63	1,521	3	1	1	24	7	6	..	39
Massachusetts	20	138	228	619	1,256	228	217	2,686	19	26	67	214	313	141	44	805
Michigan	25	139	408	952	1,568	150	295	3,512	14	62	305	623	1,034	128	109	2,261
Minnesota	14	44	122	243	567	36	75	1,087	10	16	91	238	360	121	13	839
Mississippi	2	2	28	46	145	2	100	323	2	3	1	4	...	..	..	8
Missouri	6	12	134	342	1,318	17	197	2,020	9	15	44	110	276	14	42	501
Montana	1	6	50	61	50	5	36	208	4	8	6	55	38	17	2	126
Nebraska	1	19	42	32	73	6	3	175	5	2	6	30	87	14	8	147
Nevada	..	...	...	...	...	...	...	...	2	9	...	12	8	..	16	45
New Hampshire	2	21	31	50	73	2	...	177	..	..	...	...	...	..	..	...
New Jersey	17	230	270	726	1,809	130	589	3,754	14	21	77	466	558	81	145	1,348
New Mexico	7	49	118	181	278	31	21	678	8	21	40	167	487	25	20	760
New York	57	493	1,338	3,179	4,710	443	1,252	11,415	42	170	471	1,786	2,702	256	623	6,008
North Carolina	15	100	176	520	830	75	59	1,760	2	..	3	4	2	..	..	9
North Dakota	1	10	68	76	95	12	32	293	4	..	1	11	19	13	2	46
Ohio	20	583	702	1,495	1,577	100	159	4,616	16	52	100	367	748	143	32	1,442
Oklahoma	4	189	145	210	612	49	189	1,394	6	23	9	139	158	4	..	333
Oregon	3	61	62	157	149	13	34	476	1	..	...	2	2	..	..	4
Pennsylvania	16	504	491	689	1,823	215	368	4,090	19	6	56	267	512	50	2	893
Rhode Island	1	6	46	102	144	23	16	337	2	..	27	49	62	4	..	142
South Carolina	5	25	65	120	221	18	12	461	2	6	5	32	27	..	19	89
South Dakota	1	2	22	43	52	...	19	138	4	..	9	45	44	31	6	135
Tennessee	5	171	75	357	296	22	49	970	4	..	14	55	63	22	..	154
Texas	14	399	579	1,326	718	137	17	3,176	6	8	48	154	322	53	..	585
Utah	..	...	...	...	...	...	...	...	1	..	1	18	23	1	..	43
Vermont	2	...	9	45	71	27	13	165	1	..	...	1	...	..	..	1
Virginia	7	74	154	334	718	47	47	1,374	7	3	11	63	70	3	..	150
Washington	9	25	87	263	292	19	63	749	10	20	175	202	136	18	16	567
West Virginia	5	39	32	87	300	22	34	514	1	..	...	...	77	5	..	82
Wisconsin	21	179	256	641	882	127	111	2,196	7	1	78	243	400	34	4	760
Wyoming	1	...	4	5	37	12	...	58	4	..	4	15	6	2	1	28
Totals	427	5,396	7,964	17,727	31,175	3,051	5,532	70,845	345	685	2,337	8,013	12,872	1,627	1,253	26,787

FEDERAL SANATORIUMS AND DEPARTMENTS

Included in the federal classification are forty-five tuberculosis institutions of the Indian Administration, eighteen Army hospitals, seven Naval hospitals, twenty under the control of the U. S. Public Health Service, fifty assigned to the U. S. Veterans Bureau and nine other federal departments. In all there are nineteen sanatoriums, 129 tuberculosis departments and one preventorium with a total capacity of 9,076 beds. The sanatoriums have 3,970 beds, the tuberculosis depart-

ments 5,026 and the preventoriums eighty. This is a decrease of 1,864 since 1935, when eighteen sanatoriums and 151 departments reported a combined capacity of 10,940 beds, including 328 for children. At present there are 657 beds for children with all but six assigned to the Indian Service. As shown in table 29, the federal institutions admitted 14,900 patients in 1938, treated 21,883 and maintained an average daily census of 6,703. The former report showed an admission rate of 15,523.

In 1935 the Indian Administration reported eleven sanatoriums and forty-one tuberculosis departments with a total capacity of 1,471 beds. Twelve sanatoriums are in operation at present, thirty-two tuberculosis departments and one preventorium. These have a capacity of 1,609 including 651 beds for children. The Sioux Sanatorium, Rapid City, S. D., has been added to the list since the previous survey, and the Kayenta Sanatorium, Kayenta, Ariz., was transferred from the departments to the sanatorium classification. However, the Fort Defiance Sanatorium, Fort Defiance, Ariz., became a unit of the Navajo General Hospital and was accordingly listed as a department. Although the bed capacity has increased, the scope of the clinical service remains practically unchanged. The admissions, totaling 2,626, are almost identical with the report of 1935.

Table 23.—Diagnostic and Therapeutic Facilities Classified by States

	Sanatoriums								Departments							
	Pneumothorax		Tuberculosis Clinics		X-Ray Departments		Laboratory Departments		Pneumothorax		Tuberculosis Clinics		X-Ray Departments		Laboratory Departments	
State	In-patient	Out-patient	Yes	Field	Yes	M.D.	Yes	M.D.	In-patient	Out-patient	Yes	Field	Yes	M.D.	Yes	M.D.
Alabama	6	6	5	1	7	4	2	2	6	4	7	1	12	11	12	11
Arizona	13	8	3	2	10	6	8	3	8	5	5	1	7	6	7	5
Arkansas	2	2	2	..	2	2	2	2	1	1	..	..	2	2	3	2
California	24	24	17	1	30	25	28	20	31	26	30	..	40	36	37	32
Colorado	15	7	6	..	10	6	10	7	5	5	6	1	12	9	12	9
Connecticut	7	7	5	..	8	7	7	6	4	2	..	..	4	4	5	3
Delaware	2	2	1	..	1	1	1	1	..	..	..	..	2	2	2	2
Dist. of Columbia	1	.	..	..	1	1	1	1	4	2	4	..	9	9	9	9
Florida	3	2	1	..	2	1	2	1	12	7	6	..	14	14	14	10
Georgia	4	1	3	1	4	1	4	1	3	4	3	..	5	5	5	4
Idaho	1	1	..	..	1	1	1	..	2	2	1	..	4	3	4	3
Illinois	26	22	21	..	26	20	21	11	10	5	5	..	23	19	23	19
Indiana	10	10	7	1	10	8	9	7	3	3	4	..	6	4	6	5
Iowa	6	6	4	..	6	5	6	3	5	4	4	..	12	10	10	7
Kansas	3	2	1	..	1	..	2	1	5	3	7	..	11	11	10	10
Kentucky	5	5	2	1	4	3	4	3	6	4	5	..	12	9	12	9
Louisiana	4	2	2	..	5	4	4	3	5	4	5	..	5	5	5	4
Maine	4	4	3	..	4	4	4	2	4	2	3	..	7	6	7	5
Maryland	7	7	4	..	6	5	6	5	6	2	2	..	8	8	10	9
Massachusetts	20	16	18	..	20	15	18	14	14	10	9	..	24	22	23	23
Michigan	25	22	16	..	24	19	20	15	15	10	7	2	25	22	24	20
Minnesota	15	15	10	4	15	14	13	10	8	5	6	..	15	14	14	13
Mississippi	1	1	2	1	1	1	2	2	2	1	5	..	17	11	16	9
Missouri	6	4	3	..	6	5	6	5	8	6	5	..	18	17	16	14
Montana	1	1	..	..	1	..	1	..	4	2	4	1	7	7	7	7
Nebraska	1	1	..	..	1	1	1	1	4	3	3	1	7	6	7	6
Nevada	..	..	..	..	..	..	..	..	..	..	1	1	2	1	1	1
New Hampshire	2	2	2	..	2	2	2	2	1	1	..	..	1	1	1	1
New Jersey	17	16	10	1	15	8	14	7	19	9	8	1	20	20	20	20
New Mexico	7	4	4	..	6	6	6	3	6	4	6	1	10	10	10	10
New York	55	44	38	5	53	47	43	36	39	23	26	..	56	54	57	55
North Carolina	18	15	8	..	14	10	9	3	2	2	3	..	6	5	6	4
North Dakota	1	1	1	..	1	1	1	1	4	4	4	..	7	6	6	6
Ohio	20	18	15	..	22	15	22	12	16	8	9	..	25	19	24	18
Oklahoma	5	5	4	..	4	3	4	2	6	5	5	..	9	6	9	5
Oregon	4	2	2	..	3	1	3	1	1	1	1	..	1	..	2	1
Pennsylvania	16	14	7	..	15	11	13	9	17	10	10	..	33	32	35	32
Rhode Island	1	1	1	..	1	..	1	..	1	1	1	..	2	2	2	2
South Carolina	5	4	2	..	4	2	4	1	2	2	2	..	3	3	3	3
South Dakota	2	2	1	..	2	2	2	1	2	2	4	..	5	4	5	5
Tennessee	6	5	4	..	6	4	5	2	5	4	4	1	11	11	9	8
Texas	16	12	2	..	12	9	12	5	9	7	10	..	16	13	16	12
Utah	..	..	..	..	..	..	..	..	2	1	1	..	4	4	4	4
Vermont	2	2	2	..	2	2	2	1	..	..	2	..	1	1	1	1
Virginia	8	6	5	..	8	5	6	1	6	2	5	1	10	10	11	9
Washington	9	9	6	..	9	6	8	5	7	7	8	..	17	15	16	14
West Virginia	5	4	1	..	4	3	3	2	2	2	3	..	4	4	4	4
Wisconsin	20	16	12	..	20	7	20	4	6	5	8	1	13	12	13	11
Wyoming	1	1	1	1	1	..	1	..	..	..	2	..	4	4	3	3
Totals	442	361	264	19	410	303	364	224	328	222	259	13	568	509	558	479

Table 24.—Diagnostic and Therapeutic Facilities Classified by Control

	Sanatoriums								Departments							
	Pneumothorax		Tuberculosis Clinics		X-Ray Departments		Laboratory Departments		Pneumothorax		Tuberculosis Clinics		X-Ray Departments		Laboratory Departments	
Control	In-patient	Out-patient	Yes	Field	Yes	M.D. in Charge	Yes	M.D. in Charge	In-patient	Out-patient	Yes	Field	Yes	M.D. in Charge	Yes	M.D. in Charge
Federal	19	18	10	2	19	18	19	12	74	55	79	6	124	116	121	113
State	67	57	48	7	68	47	65	38	59	18	37	2	106	84	105	76
County	173	158	126	9	166	127	145	92	43	34	34	2	50	42	48	38
City	18	13	9	..	19	16	13	10	44	30	27	..	54	53	54	49
City-County	14	11	9	..	12	6	11	4	4	4	3	..	6	5	6	5
Private	151	104	62	1	126	89	111	68	104	81	79	3	228	209	224	198
Totals	442	361	264	19	410	303	364	224	328	222	259	13	568	509	558	479

but the average daily census has increased from 1,028 to 1,185. There were 3,644 patients treated with 116 days as the average length of stay. Vacancies totaled 480, patients on the waiting list 180. Thirty-nine of the institutions in this group report x-ray departments,

Table 25.—Nursing Personnel in Tuberculosis Sanatoriums Classified by States

State	Number Reporting	Average Census	Registered Nurses	Other Graduates	Training Schools	Students	Attendants
Alabama	6	199	23	8	..	..	12
Arizona	13	397	49	7	..	..	63
Arkansas	2	699	14	98	..	..	36
California	37	4,103	425	18	4	48	390
Colorado	13	921	39	36	1	2	55
Connecticut	8	1,540	317	16	2	245	80
Delaware	2	173	16	..	..	..	24
District of Columbia	1	515	58	..	..	..	...
Florida	5	478	44	20	..	..	25
Georgia	4	541	22	4	..	..	47
Idaho	1	125	8	..	..	..	6
Illinois	27	3,164	223	23	1	4	210
Indiana	10	1,308	67	28	..	..	116
Iowa	6	758	30	7	1	2	73
Kansas	4	423	12	4	..	..	5
Kentucky	4	922	66	3	..	..	155
Louisiana	5	244	13	1	..	..	31
Maine	4	454	45	8	1	1	17
Maryland	6	1,207	12	71	3	73	114
Massachusetts	20	3,058	343	36	4	18	335
Michigan	25	3,122	315	44	..	..	240
Minnesota	15	1,783	170	43	2	17	106
Mississippi	4	279	45	..	1	14	3
Missouri	6	1,616	107	3	1	2	312
Montana	1	203	22	2	..	..	9
Nebraska	1	154	4	1	1	13	...
New Hampshire	2	190	13	7	..	..	6
New Jersey	17	2,896	273	40	1	2	192
New Mexico	7	492	38	6	..	..	42
New York	55	9,317	971	332	3	27	483
North Carolina	19	2,092	158	26	1	44	168
North Dakota	1	313	17	5	..	..	22
Ohio	19	2,998	252	12	1	5	246
Oklahoma	5	797	22	3	..	..	65
Oregon	4	541	46	8	1	3	28
Pennsylvania	16	3,852	224	56	2	17	180
Rhode Island	2	501	43	1	..	..	57
South Carolina	5	673	49	10	..	..	65
South Dakota	2	249	27	12	..	..	19
Tennessee	5	950	48	39	..	..	55
Texas	16	1,651	29	65	1	57	55
Vermont	2	110	8	..	..	..	8
Virginia	8	1,129	31	47	3	63	26
Washington	8	576	67	4	3	9	22
West Virginia	6	816	48	39	..	..	55
Wisconsin	20	1,956	197	30	1	7	131
Wyoming	1	26	4	..	..	..	...
Totals	450	60,511	5,054	1,223	39	673	4,389

thirty-six have laboratory units and twenty-four provide pneumothorax equipment.

In the previous survey, thirteen hospitals of the U. S. Army reported 630 beds for tuberculosis and 1,197 admissions. At present there are eighteen tuberculosis departments, 617 beds and an annual admission rate of 1,817. Information concerning the average daily occupancy is incomplete, however, but the census at the beginning of the year was 446. All these hospitals have x-ray and laboratory departments, and five supply facilities for the administration of pneumothorax.

Naval hospitals report seven tuberculosis departments, 152 beds for tuberculosis, 177 admissions and an average daily census of 100. All indicate that facilities are available for pneumothorax and laboratory and x-ray service. In 1935 there were ten tuberculosis departments, 176 beds and 351 admissions in this group.

In the hospitals of the United States Public Health Service there are 811 beds for tuberculosis: 244 in a sanatorium and 567 in nineteen tuberculosis departments. Formerly there were 783 beds available in one sanatorium and twenty-five departments. An increase occurred in the number of admissions and also in the average daily census. Admissions totaled 1,002 and the average occupancy 585 as compared to 738 and 398 in 1934. X-ray and laboratory facilities are furnished in all the institutions in this group. Seventeen have pneumothorax equipment and twelve indicate that collapse therapy is made available to outpatients.

In the Veterans hospitals there has been a considerable decrease in the number of beds for tuberculosis. While the previous report showed six sanatoriums and fifty-nine tuberculosis departments with a capacity of 7,734 beds, the present survey reveals only 5,671 in forty-four departments and six hospitals that limit their service to tuberculosis. The sanatoriums have 2,713 beds, the tuberculosis departments 2,958. There has also been a decrease in the number of admissions from 10,493 to 9,099. On the other hand the reports indicate an increase in the average daily occupancy when compared with the data supplied in 1934. All the Veterans hospitals included in this study have x-ray and laboratory departments, thirty-six have pneumothorax equipment and thirty provide facilities for outpatient pneumothorax service.

There are nine other federal hospitals that report 216 beds for tuberculosis, 279 admissions and an average daily census of 111. These institutions also have x-ray and laboratory facilities and four furnish equipment for collapse therapy.

STATE SANATORIUMS

At present there are seventy-two state sanatoriums with a total capacity of 21,066 beds: 18,203 for adults and 2,863 for children, including 656 preventorium beds. This represents a net increase of seven institutions and 3,758 beds since the report of 1935. With the addition of new institutions in Arizona, Florida, New Mexico and Utah there are now forty states that own and operate sanatoriums for the treatment of tuberculosis. In Kansas, Michigan, North Carolina and Texas new units have also been added to supplement previous facilities, whereas in Oklahoma a change in service necessitated the reclassification of one of the state sanatoriums as a tuberculosis department. The additions to the list include the State Welfare Sanatorium, Tempe, Ariz., the Florida State Sanatorium, Orlando, Fla., Kenney Memorial Hospital, Norton, Kan., Northern Michigan Tuberculosis Sanatorium, Gaylord, Mich., State Tuberculosis Sanatorium, Socorro, N. M., Western North Carolina Sanatorium, Black Mountain,

Table 26.—Nursing Personnel in Tuberculosis Sanatoriums Classified by Control

Control	Number Reporting	Average Census	Registered Nurses	Other Graduates	Training Schools	Students	Attendants
Indian Administration	12	840	81	12	..	..	105
U. S. Public Health Service	1	173	10	...	..	..	14
Veterans Bureau	6	2,398	281	...	..	..	378
State	71	18,504	1,173	382	12	274	1,252
County	177	19,375	1,734	356	13	87	1,423
City	20	7,960	963	116	1	18	451
City-County	15	1,973	92	40	..	..	173
Private	148	9,288	720	317	13	294	593
Totals	450	60,511	5,054	1,223	39	673	4,389

N. C., Kerrville State Sanatorium, Kerrville, Texas, and the Utah State Tuberculosis Sanatorium, Ogden, Utah. The Soldiers' Tubercular Sanatorium, Sulphur, Okla., was transferred from the sanatorium to the department list.

As shown in table 30, the state sanatoriums admitted 21,917 patients: 18,173 adults, 2,716 children and 1,028 unclassified. A total of 39,986 patients were treated during the year. At the end of the twelve months period there were 18,889 patients under treatment and

At present there are eighty-five sanatoriums and hospitals approved for residencies in tuberculosis. These include fifteen state sanatoriums, as indicated by the plus sign (✚) in the accompanying list of tuberculosis institutions.

COUNTY SANATORIUMS

The county sanatoriums, now constituting the largest group of tuberculosis institutions, show a net increase of ten since the previous survey. Seventeen institutions have been added to the list, six have been discontinued

Table 27.—Hospital Facilities for Children Classified by States

State	Sanatoriums: Preventorium Beds	Sanatoriums: Total Beds for Children	Departments: Preventorium Beds	Departments: Total Beds for Children	Preventoriums: Bed Capacity	Preventoriums: For Preventorium Care	Total Beds: Total Beds for Children	Children Admitted: Sanatoriums	Children Admitted: Departments	Children Admitted: Preventoriums	Children Admitted: Total	Number Treated: Sanatoriums	Number Treated: Departments	Number Treated: Preventoriums	Number Treated: Total	Average Census: Sanatoriums	Average Census: Departments	Average Census: Preventoriums	Average Census: Total
Alabama	..	12	3	5	..	3	17	17	..	..	17	30	..	..	30	12	..	..	12
Arizona	70	126	..	16	130	200	272	191	33	185	409	253	33	185	471	85	1	..	86
Arkansas	..	95	..	..	..	..	95	266	..	..	266	366	..	..	366	96	..	..	96
California	206	535	20	241	394	620	1,170	478	171	301	950	982	351	461	1,794	491	68	160	719
Colorado	49	76	..	..	..	49	76	63	11	..	74	119	12	..	131	7	4	..	11
Connecticut	..	427	..	..	..	..	427	96	5	..	101	396	5	..	401	333	..	..	333
Delaware	10	46	..	..	24	34	70	13	..	15	28	45	..	35	80	23	..	20	43
District of Columbia	..	300	..	6	..	..	306	..	16	..	16	..	16	..	16	..	..	..	..
Florida	22	22	..	4	25	47	51	30	3	137	170	30	4	137	171	22	1	..	23
Georgia	151	175	..	..	15	166	190	98	..	..	98	246	..	..	246	39	..	..	39
Idaho	66	132	..	..	..	66	132	203	2	..	205	280	2	..	282	125	1	..	126
Illinois	73	183	..	14	48	121	245	611	18	100	729	782	30	100	912	138	10	..	148
Indiana	25	142	..	..	..	25	142	315	3	..	318	438	6	..	444	97	..	..	97
Iowa	..	55	..	12	..	..	67	65	10	..	75	98	10	..	108	30	..	..	30
Kansas	10	44	..	6	..	10	50	151	10	..	161	185	12	..	197	34	2	..	36
Kentucky	120	125	..	1	..	120	126	159	6	..	165	269	6	..	275	110	..	..	110
Louisiana	16	16	..	..	..	16	16	18	148	..	166	25	148	..	173	11	..	..	11
Maine	..	56	..	..	..	..	56	37	..	..	37	66	3	..	69	20	3	..	23
Maryland	..	194	..	..	..	..	194	185	3	..	188	398	3	..	401	208	..	..	208
Massachusetts	..	530	32	39	135	167	704	287	46	306	639	753	56	358	1,167	385	7	52	444
Michigan	35	340	..	43	30	65	413	272	182	..	454	379	213	..	592	59	42	..	101
Minnesota	60	78	..	10	80	140	168	81	46	88	215	149	54	163	366	54	3	75	132
Mississippi	50	50	..	..	..	50	50	1	..	..	1	2	..	..	2	..	..	..	..
Missouri	32	86	..	14	81	113	181	96	80	34	210	129	94	34	257	34	7	..	41
Montana	..	10	2	9	..	2	19	11	24	..	35	21	27	..	48	10	4	..	14
Nebraska	..	33	..	..	..	..	33	24	..	..	24	52	3	..	55	33	..	..	33
Nevada	..	..	..	..	..	..	..	..	22	..	22	..	27	..	27	..	..	..	..
New Hampshire	..	25	..	..	..	..	25	20	..	..	20	43	..	..	43	18	..	..	18
New Jersey	189	340	63	97	225	477	662	331	70	628	1,029	591	140	847	1,578	318	71	219	608
New Mexico	..	81	..	5	..	..	86	82	16	..	98	161	17	..	178	42	..	..	42
New York	332	1,465	53	259	257	642	1,981	1,192	356	491	2,039	2,334	492	559	3,385	960	139	68	1,167
North Carolina	40	111	..	44	..	40	155	75	..	..	75	169	..	..	169	69	..	..	69
North Dakota	..	10	..	5	80	80	95	20	13	100	133	40	14	163	217	12	..	63	75
Ohio	100	456	10	27	100	210	583	509	41	295	845	1,016	49	335	1,400	291	4	40	335
Oklahoma	70	80	..	37	..	70	117	206	78	..	284	322	100	..	422	68	23	..	91
Oregon	36	36	..	1	..	36	37	39	..	..	39	77	..	..	77	45	..	..	45
Pennsylvania	280	693	4	112	188	472	993	722	23	231	976	1,332	41	311	1,684	634	5	80	719
Rhode Island	..	82	..	..	68	68	150	16	3	125	144	46	3	168	217	..	..	43	43
South Carolina	12	62	..	..	..	12	62	63	..	..	63	114	..	..	114	54	..	..	54
South Dakota	..	..	..	..	..	..	..	4	24	..	28	4	30	..	34	..	..	..	..
Tennessee	..	265	..	1	50	50	316	205	23	77	305	431	23	77	531	127	3	..	130
Texas	236	246	..	..	..	236	246	568	8	..	576	648	8	..	656	80	..	..	80
Utah	..	..	..	..	..	..	..	..	3	..	3	..	3	..	3	..	..	..	..
Vermont	..	..	..	..	80	80	80	4	..	106	110	4	..	176	180	..	..	70	70
Virginia	60	124	..	..	..	60	124	139	..	..	139	200	..	..	200	24	..	..	24
Washington	14	77	50	273	..	64	350	85	225	..	310	141	417	..	558	41	168	..	209
West Virginia	30	90	2	6	..	32	96	78	3	..	81	138	3	..	141	77	..	..	77
Wisconsin	53	154	..	1	134	187	289	206	36	85	327	330	37	85	452	66	..	..	66
Wyoming	..	..	..	..	..	..	..	..	3	..	3	..	4	..	4	..	..	..	..
Totals	2,447	8,285	239	1,288	2,144	4,830	11,717	8,332	1,764	3,304	13,400	14,634	2,496	4,194	21,324	5,382	566	890	6,838

a waiting list of 4,992 in comparison to 2,177 vacancies. The average daily census was 18,448, the average length of stay 170.

Facilities for pneumothorax are now available in sixty-seven of the state sanatoriums, and fifty-seven have made arrangements for collapse therapy in the outpatient department. Sixty-eight have x-ray equipment, sixty-five provide laboratory facilities and forty-eight conduct tuberculosis clinics. Field clinics are also sponsored by seven of the institutions in this group.

The nursing personnel consists of 1,173 registered nurses, 382 other graduates, 274 students and 1,252 attendants. The student nurses are distributed in twelve training schools.

and one has been reclassified as a tuberculosis department. The additions include the Morgan County Tuberculosis Sanatorium, Flint, Ala.; Batson Memorial Sanatorium, Lafayette, Ala.; Pauling Rest Home, San Fernando, Calif.; San Luis Obispo County Tuberculosis Sanatorium, San Luis Obispo, Calif.; Lake County Sanatorium, Waukegan, Ill.; Hillcrest Tuberculosis Hospital, Vincennes, Ind.; Kenton County Tuberculosis Hospital, Covington, Ky.; Ontonagon County Sanatorium, Rockland, Mich.; Jones County Cottage Sanatorium, Ellisville, Miss.; Hinds County Tuberculosis Sanatorium, Raymond, Miss.; Hudson County Tuberculosis Sanatorium, Jersey City, N. J.; Roosevelt Hospital, Metuchen, N. J.; Tuscarawas County

Sanatorium, New Philadelphia, Ohio; William Roche Memorial Tuberculosis Hospital, Toledo, Ohio; Erie County Tuberculosis Hospital, Erie, Pa.; Bexar County Tuberculosis Colony, Southton, Texas, and the Blue Mountain Sanatorium, Walla Walla, Wash.

The Pima County Hospital, Tucson, Ariz., is now listed under tuberculosis departments, whereas the following sanatoriums have discontinued their service: Maricopa County Tuberculosis Hospital, Phoenix, Ariz.; Bon Air Tuberculosis Sanatorium, Ontonagon, Mich.; Greene County Tuberculosis Sanatorium, Springfield, Mo.; Pleasant Valley Sanatorium, Bath, N. Y.; Tompkins County Tuberculosis Hospital, Trumansburg, N. Y., and the Lucas County Tuberculosis Hospital, Toledo, Ohio.

the outpatient departments. One hundred and twenty-six report tuberculosis clinics within the institution and it was also indicated that nine conduct an outpatient service in the field.

Registered nurses total 1,734, other graduates 356, student nurses eighty-seven and attendants 1,423. Thirteen of the sanatoriums in this group participate in the training of student nurses. It is also of interest to note that twenty-four county sanatoriums have been approved for residencies in tuberculosis.

MUNICIPAL SANATORIUMS

The District of Columbia and the states of Illinois, Massachusetts, Michigan, Missouri, New York, Ohio, Pennsylvania and Virginia have sanatoriums under

Table 28.—Hospital Facilities for Children Classified by Control

Control	Sanatoriums: Preventorium Beds	Sanatoriums: Total Beds for Children	Departments: Preventorium Beds	Departments: Total Beds for Children	Preventoriums: Bed Capacity	Total Beds: For Preventorium Care	Total Beds: Total Beds for Children	Children Admitted: Sanatoriums	Children Admitted: Departments	Children Admitted: Preventoriums	Children Admitted: Total	Number Treated: Sanatoriums	Number Treated: Departments	Number Treated: Preventoriums	Number Treated: Total	Average Census: Sanatoriums	Average Census: Departments	Average Census: Preventoriums	Average Census: Total
Federal	136	319	...	258	80	216	657	519	415	100	1,034	760	628	163	1,551	240	173	63	476
State	656	2,877	10	137	...	666	3,014	2,729	252	...	2,981	5,036	282	...	5,318	1,981	27	...	2,008
County	1,050	2,706	96	374	490	1,636	3,570	2,569	401	413	3,383	4,928	733	469	6,130	2,005	226	56	2,287
City	...	1,149	119	159	...	119	1,308	1,177	229	...	1,406	1,782	284	...	2,066	534	35	...	569
City-County	309	436	...	135	130	439	701	594	29	165	788	919	73	240	1,232	186	43	75	304
Private	296	798	14	225	1,444	1,754	2,467	744	438	2,626	3,808	1,209	496	3,322	5,027	436	62	696	1,194
Totals	2,447	8,285	239	1,288	2,144	4,830	11,717	8,332	1,764	3,304	13,400	14,634	2,496	4,194	21,324	5,382	566	890	6,838

Table 29.—Federal Tuberculosis Departments and Sanatoriums

Control	Number of Sanatoriums	Bed Capacity	Number of Departments	Bed Capacity	Admissions: Sanatoriums	Admissions: Departments	Patients Treated: Sanatoriums	Patients Treated: Departments	Average Daily Census: Sanatoriums	Average Daily Census: Departments	Patients Present: Sanatoriums	Patients Present: Departments	X-Ray Departments	Laboratory Departments	Pneumothorax: Inpatient	Pneumothorax: Outpatient
Indian Administration	12	1,013	32	516	1,326	1,200	2,062	1,519	840	282	736	319	39	36	24	20
U. S. Army	..	...	18	617	...	1,817	...	2,263	...	42	...	446	18	18	5	3
U. S. Navy	..	...	7	152	...	177	...	300	...	100	...	123	7	7	7	4
U. S. Public Health Service	1	244	19	567	167	835	345	1,241	173	412	178	406	20	20	17	12
Veterans Bureau	6	2,713	44	2,958	4,229	4,870	6,630	7,135	2,398	2,345	2,401	2,265	50	50	36	30
Other Federal	..	...	9	216	...	279	...	388	...	111	...	109	9	9	4	4
Totals	19	3,970	129	5,026	5,722	9,178	9,037	12,846	3,411	3,292	3,315	3,668	143	140	93	73

Indian Administration: 1 Preventorium, 80 beds; 100 admissions, 63 average census.

There are at present twenty-six states in which sanatoriums are operated under county control, the same number as reported in 1935. At that time, however, Arizona was included but not the state of Mississippi.

In table 31 it can be noted that 182 county sanatoriums provide 22,206 beds: 19,500 for adults and 2,706 for children. This represents an increase of 2,092 since the previous survey. Of the beds for children 1,050 are utilized for preventorium care. Admissions total 22,778, patients treated 42,243, the average daily census 19,481 and patients under treatment at the end of the year 19,521. The number of patients on the waiting list was 1,095, although vacancies totaled 2,685. In these institutions the average length of stay was 171 days.

One hundred and sixty-six of the county sanatoriums have x-ray departments, 145 have laboratory facilities and 173 provide pneumothorax equipment. Collapse therapy has also been extended into 158 of

municipal control. Since the previous survey, which showed twenty-two institutions in this group, there have been three sanatoriums added, four removed and one transferred to the list of tuberculosis departments. The additions include the Municipal Tuberculosis Home, North Riverside, Ill., the Rockford Municipal Sanatorium, Rockford, Ill., and the Cleveland Tuberculosis Sanatorium at Warrensville, Ohio, formerly classified as city-county institutions. Three institutions discontinued their service: the Health Department Hospital, Chicopee, Mass.; the Holyoke Tuberculosis Sanatorium, Holyoke, Mass., and the Convalescent Tuberculosis Hospital, Cleveland. The Tuberculosis Hospital, Washington, D. C., was also removed from the list, since it has now been combined with the Tuberculosis Sanatorium at Glenn Dale, Md. Formerly the Tuberculosis Department of Baltimore City Hospital was also included but has now been reclassified as a tuberculosis department.

Accordingly there are now twenty municipal sanatoriums in operation with a total capacity of 8,486 beds, including 1,149 beds for children. Reference to the corresponding section of the 1935 report will indicate that the bed capacity has increased by 1,121 even though the number of institutions has decreased.

The municipal sanatoriums admitted 8,993 patients, treated 16,603 and maintained an average daily census of 7,960. The average length of stay was 175 days. At the end of the twelve months period there were 8,008 patients under treatment, 207 on the waiting list and 478 vacancies.

Diagnostic and therapeutic facilities are provided as follows: x-ray departments nineteen, clinical laboratories thirteen, tuberculosis clinics nine. Of eighteen sanatoriums equipped for the administration of pneumothorax, thirteen have made arrangements for collapse therapy in the outpatient department.

The reports indicate that only one of the municipal sanatoriums offers facilities for the training of nurses. Listed in the nursing division are eighteen students, 963 registered nurses, 116 unregistered graduates and 451 attendants. Eight institutions in this group are approved by the American Medical Association for residencies in tuberculosis.

Table 30.—State Sanatoriums Classified by States

State	Number Sanatoriums	Bed Capacity			Patients Admitted			Patients Treated	Average Census	Patients Present
		Adults	Children	Total	Adults	Children	Total			
Arizona	1	110	...	110	183	...	183	243	91	104
Arkansas	2	637	95	732	670	266	936	1,665	699	819
Connecticut	5	977	427	1,404	780	92	872	2,191	1,314	1,283
Delaware	2	154	46	200	101	13	114	285	173	171
Florida	1	318	...	318	467	1	468	784	313	316
Georgia	1	232	96	328	515	70	585	879	260	259
Indiana	1	250	...	250	129	47	223*	425	214	150
Iowa	1	420	...	420	291	...	291	642	389	409
Kansas	2	519	24	543	198	30	228	558	323	325
Kentucky	1	125	5	130	227	1	228	289	91	107
Louisiana	1	111	...	111	79	...	79	170	97	108
Maine	3	399	56	455	435	36	471	912	435	435
Maryland	4	886	146	1,032	1,168	120	1,288	2,239	959	1,009
Massachusetts	4	684	474	1,158	585	260	845	1,832	1,015	990
Michigan	3	840	80	920	577	45	622	1,310	717	706
Minnesota	1	480	...	480	421	47	468	816	381	397
Mississippi	1	400	50	450	307	1	308	533	254	273
Missouri	1	677	14	691	846	45	891	1,380	626	681
Montana	1	198	10	208	197	11	208	409	203	210
Nebraska	1	128	33	161	151	24	175	305	154	148
New Hampshire	1	140	...	140	74	...	74	170	107	103
New Jersey	1	384	110	494	346	83	429	882	416	475
New Mexico	1	65	...	65	65	...	65	122	58	65
New York	4	900	150	1,050	1,007	53	1,060	1,857	871	897
North Carolina	2	610	70	680	927	49	976	1,576	668	656
North Dakota	1	358	10	368	273	20	293	619	313	305
Ohio	1	257	...	257	273	132	405	616	211	236
Oklahoma	2	612	70	682	966	122	1,088	1,665	606	624
Oregon	2	489	36	525	314	36	350	827	480	502
Pennsylvania	3	1,898	486	2,384	1,337	607	1,944	4,195	2,288	2,271
Rhode Island	1	548	82	630	348	16	364	779	466	502
South Carolina	1	394	46	440	...	30	551*	928	426	413
South Dakota	1	192	...	192	134	4	138	369	148	167
Texas	2	865	172	1,037	2,322	373	2,695	3,642	943	1,022
Utah	1	96	...	96	...	...	...	...	...	...
Vermont	2	127	...	127	161	4	165	272	110	104
Virginia	3	720	40	760	557	59	1,076*	1,816	736	750
West Virginia	3	688	35	723	516	19	535	1,293	621	614
Wisconsin	2	282	...	282	168	...	168	410	246	257
Wyoming	1	33	...	33	58	...	58	81	26	26
Totals	72	18,203	2,863	21,066	18,173	2,716	21,917*	39,986	18,448	18,889

* Partly unclassified.

CITY-COUNTY SANATORIUMS

In 1935 there were fifteen city-county sanatoriums in operation in eleven states. Sixteen institutions are reported in the present survey, but two of the states are no longer represented on the list, namely Illinois and Ohio. Florida and North Carolina have been added, however, so that there are still eleven states that have sanatoriums under city-county control. The additions to the list include the Escambia County Tuberculosis Sanatorium, Pensacola, Fla.; the Negro Tuberculosis Hospital, Jacksonville, Fla., and the Wake County Tuberculosis Sanatorium, Raleigh, N. C. Two sanatoriums formerly included in this group have been transferred to the municipal classification, namely the Rockford Municipal Sanatorium, Rockford, Ill., and the Sunny Acres, Cleveland Tuberculosis Sanatorium, Warrensville, Ohio.

The city-county sanatoriums have a total capacity of 2,191 beds, a decrease of 232 since the last report. There are 1,755 beds for adults and 436 for children, including 309 for preventorium care. The following statistical data illustrate the extent of tuberculosis hospitalization in this division: admissions 2,712, patients treated 4,675, average daily census 1,995, census at end of year 1,996, average length of stay 156 days, waiting list 301, number of vacancies 195. Reference should be made to table 33.

Fourteen sanatoriums provide pneumothorax facilities for inpatients and eleven for outpatients, twelve have x-ray departments and eleven report laboratory units. Tuberculosis clinics are now conducted in nine of these institutions.

Ninety-two registered nurses are employed, forty unregistered graduates and 173 attendants.

PRIVATE SANATORIUMS

The greatest reduction in the number of tuberculosis sanatoriums has occurred in the private group, where

there are now 170 institutions as compared to 178 in 1935. At present there are thirty-two states where sanatoriums are operated under private control; formerly also the state of Georgia was included. By comparison with the previous report it will be noted that eighteen sanatoriums have since been added to the list, whereas twenty-seven have been removed.

Additions occurred in the states of Alabama, California, Connecticut, Florida, Louisiana, Massachusetts, Michigan, New Mexico, New York, Ohio, Texas and Virginia. During the same period twenty-seven sanatorium services were discontinued or reclassified in Arizona, California, Colorado, Georgia, Illinois, New Jersey, New Mexico, New York, North Carolina, Pennsylvania, Tennessee, Texas and Washington.

The private sanatoriums represent various types of ownership and control and differ widely in size and completeness of hospital service. Their average capacity is the lowest of any of the sanatorium groups, being only seventy-four beds. The state sanatoriums average 293, the county 122, the municipal 424 and the city-county sanatoriums 137. The present capacity is 12,794 beds, as compared to 13,864 in 1935. Included are 11,996 beds for adults and 798 for children with 296 allocated to preventorium care.

Although the number of institutions and the bed capacity have decreased there has been no corresponding reduction in the clinical service. On the contrary there has been a slight increase in patient personnel, as indicated in table 34. The admissions total 14,644, the number of patients treated 23,890 and the average daily census 9,591. In 1935 the corresponding figures were 14,480, 21,104 and 9,490. At the end of the year the private sanatoriums had 750 on the waiting list with vacancies totaling 3,537. A slight reduction occurred in the average length of stay, which is now reported as 147 days.

Of 170 sanatoriums in this group 126 have x-ray departments, 111 have laboratory facilities and sixty-two conduct tuberculosis clinics. One hundred and fifty-one private sanatoriums have facilities for the administration of pneumothorax, including 104 that have also made provisions for an outpatient pneumothorax service.

It has been shown that thirteen of these institutions employ student nurses. Altogether the nursing personnel consists of 720 registered nurses, 317 unregistered graduates, 294 students and 593 attendants. It can also be reported that thirteen of the private sanatoriums have qualified for residency approval in tuberculosis.

TUBERCULOSIS DEPARTMENTS

It has been shown in the present report that 630 tuberculosis departments supplement the facilities of the sanatorium division. In addition there is another group of 584 hospitals that admit tuberculous patients or conduct tuberculosis clinics yet do not have an inpatient service that can be classified as a departmental unit. The latter include 533 general hospitals, eleven mental institutions, three tuberculosis-isolation units, four orthopedic services and thirty-three other hospitals. Classified by control they comprise eighty federal, thirty-three state, twenty-four county, twenty-eight city, five city-county and 414 private hospitals.

Table 35 presents a summary of the tuberculosis service in hospitals that do not fall within the sanatorium classification. This shows that 439 of the 630 tuberculosis departments are in general hospitals, ninety-two in mental institutions, twenty-six in tuberculosis-isolation units, eight in orthopedic hospitals and sixty-five in other divisions.

The general hospitals have 14,824 beds for the treatment of tuberculosis, 13,939 for adults and 885 for children. On comparison with the previous report it is noted that the number of departments has increased by twenty and the bed capacity by 356. The annual admissions showed a decrease, however, from 37,124 to 34,739. Reference should be made to table 9, in which a further classification of admissions is given in accordance with the type of institutional control. The number of patients treated was 46,036, the average daily occupancy 10,119 and the census at the

Table 31.—County Sanatoriums Classified by States

State	Number of Sanatoriums	Bed Capacity			Patients Admitted			Patients Treated	Average Census	Patients Present
		Adults	Children	Total	Adults	Children	Total			
Alabama	5	247	12	259	161	12	375	543	160	177
California	12	2,014	501	2,515	2,022	432	2,576	4,938	2,450	2,426
Florida	2	92	...	92	121	2	131	271	65	66
Georgia	1	48	...	48	34	...	34	47	20	17
Illinois	17	1,498	55	1,553	1,194	42	1,277	2,334	1,158	1,072
Indiana	9	1,123	142	1,265	1,209	268	1,768	2,861	1,094	1,075
Iowa	4	315	55	370	343	55	398	779	...	359
Kansas	1	60	...	60	47	...	47	94	45	38
Kentucky	2	89	22	111	117	31	167	261	93	94
Massachusetts	7	1,325	15	1,340	1,160	3	1,163	2,372	1,232	1,172
Michigan	10	799	49	848	900	46	946	1,629	727	779
Minnesota	13	1,427	78	1,505	991	31	1,022	2,438	1,380	1,340
Mississippi	2	48	...	48	...	...	42	42	...	30
Missouri	1	115	...	115	166	...	166	280	115	115
New Jersey	11	2,347	230	2,577	2,580	248	2,828	5,022	2,315	2,232
New York	26	2,386	756	3,142	2,271	625	2,896	5,818	2,845	2,735
North Carolina	7	482	41	523	477	23	500	956	451	444
Ohio	15	1,861	384	2,245	1,785	317	2,233	4,240	2,054	2,003
Oregon	1	41	...	41	82	...	82	123	33	30
Pennsylvania	4	332	80	412	396	24	508	851	403	406
South Carolina	3	196	16	212	312	33	345	539	203	210
Tennessee	1	250	50	300	210	65	275	511	232	234
Texas	3	158	24	182	147	35	334	509	164	193
Washington	6	533	72	605	488	79	567	1,144	536	531
West Virginia	2	68	...	68	53	2	55	118	61	62
Wisconsin	17	1,646	124	1,770	1,739	196	2,043	3,523	1,645	1,681
Totals	182	19,500	2,706	22,206	19,005	2,569	22,778	42,243	19,481	19,521

beginning of the year 11,295. In 1934 the tuberculosis departments of general hospitals had 11,318 patients under treatment on the day of reporting. Of particular interest is the report that 237 of the general hospitals are now in position to administer pneumothorax; twenty-eight other hospitals in the general group indicated also that pneumothorax facilities are available.

The extension of the tuberculosis service into the general hospital field has received the endorsement of the American Medical Association, the American Hospital Association and the National Tuberculosis Association. Services of this type should be under the supervision of physicians competent in this field and should provide proper nursing technic and adequate segregation to prevent the spread of infection to other patients and hospital personnel. The fact that tuberculous patients are now accepted in at least 971 general hospitals would seem to emphasize the need for adequate isolation facilities. These could be utilized not only in the treatment of tuberculosis but also for the removal of other infectious diseases from the open wards.

The tuberculosis-isolation hospitals offer a combined service in tuberculosis and contagious diseases. Their total capacity is 7,144 beds, of which 2,813 are assigned to the tuberculosis division. As compared with the previous report, this indicates an increase of 257 beds. The number of admissions decreased, however, from 4,456 to 4,112 but the average daily occupancy increased from 2,134 to 2,448. At the end of the twelve months period there were 2,365 patients under treatment.

The list accompanying this report contains the names of twenty-six tuberculosis-isolation hospitals and further statistical data concerning the scope of service. It is shown that twenty-one furnish pneumothorax equipment, nineteen have x-ray departments, nineteen provide laboratory facilities and ten conduct tuberculosis clinics. When classified by control, these institutions exhibit the following distribution: county five, city twenty, city-county one. Twenty-six hospitals were likewise included in 1935 but three of the original group are no longer listed, whereas the following institutions have been added: Niagara Falls Municipal Hospital, Niagara Falls, N. Y.; Schenectady City Hospital, Schenectady, N. Y., and the Philadelphia Hospital for Contagious Diseases, Philadelphia.

It would seem that the information concerning tuberculosis departments in nervous and mental hospitals is incomplete even though reports were received from practically all of the institutions in this field. Apparently some of the hospitals failed to indicate their facilities for tuberculosis, since only ninety-two departments were reported as compared to 193 in the previous survey. Although the centralization of tuberculosis service has already been noted in some of the state hospitals, it would not appear that this factor alone could be responsible for a reduction of over 50 per cent in the number of institutions treating tuberculous insane. Census reports show a similar decrease especially at the end of the twelve months period, when the number of patients under treatment was 4,743 as compared to 9,321 in 1934.

The tuberculosis departments in mental hospitals report 7,189 beds at present, 1,874 patients admitted during the year and an average daily occupancy of 3,858. The previous survey listed 9,478 beds and

Table 32.—City Sanatoriums Classified by States

State	Number of Sanatoriums	Bed Capacity			Patients Admitted			Patients Treated	Average Census	Patients Present
		Adults	Children	Total	Adults	Children	Total			
District of Columbia	1	400	300	700	652	...	652	1,046	515	580
Illinois	4	1,583	96	1,679	1,428	527	1,955	3,525	1,588	1,575
Massachusetts	2	696	...	696	625	...	625	1,233	597	581
Michigan	2	828	160	988	656	160	816	1,689	921	873
Missouri	2	767	40	807	758	16	774	1,456	710	721
New York	5	2,116	380	2,496	2,676	336	3,012	5,512	2,621	2,667
Ohio	1	370	64	434	380	58	438	863	432	434
Pennsylvania	1	255	45	300	361	50	411	685	280	287
Virginia	2	322	64	386	280	30	310	594	296	290
Totals	20	7,337	1,149	8,486	7,816	1,177	8,993	16,603	7,960	8,008

Table 33.—City-County Sanatoriums Classified by States

State	Number of Sanatoriums	Bed Capacity			Patients Admitted			Patients Treated	Average Census	Patients Present
		Adults	Children	Total	Adults	Children	Total			
California	1	111	...	111	145	...	145	235	95	101
Florida	2	84	22	106	198	27	228*	311	100	101
Georgia	2	204	79	283	178	28	206	469	261	257
Kansas	1	50	20	70	90	121	211	268	55	50
Kentucky	1	422	98	520	377	127	504	996	490	499
New York	1	79	50	129	73	46	119	245	125	125
North Carolina	1	23	...	23	52	1	53	70	22	26
Pennsylvania	1	55	2	57	101	...	101	154	52	55
South Carolina	1	26	...	26	47	...	47	63	22	19
Tennessee	2	395	115	510	350	87	437	886	461	453
Texas	3	306	50	356	594	157	661	978	312	310
Totals	16	1,755	436	2,191	2,115	594	2,712*	4,675	1,995	1,996

* Partly unclassified.

2,425 admissions. In mental institutions the segregation of tuberculous patients is especially important to prevent the spread of infection in crowded wards. Separate departments are therefore considered necessary to facilitate the institutional control of tuberculosis and the application of scientific therapy. In this connection it is of interest to note that thirty-six psychiatric hospitals have supplied facilities for the administration of pneumothorax.

For comparative data concerning orthopedic hospitals and other departments, reference should be made to table 35 in the present report and to table 32 of the previous survey.

One hundred and twenty-six tuberculosis departments under state control report 7,633 beds, 4,781 admissions, 9,748 patients treated and a census of representing 99 per cent of the total bed capacity of all registered hospitals.

2. The statistical data included in this report cover a twelve months period ended either Sept. 30 or Dec. 31, 1938.

3. Included in the present study are 479 sanatoriums, 630 tuberculosis departments and thirty-one preventoriums, a total of 1,140 institutions.

4. The sanatorium group contains nineteen federal, seventy-two state, 182 county, twenty municipal, sixteen city-county and 170 private sanatoriums.

5. The tuberculosis departments are located in 439 general hospitals, ninety-two mental institutions, twenty-six tuberculosis-isolation hospitals, eight orthopedic units and sixty-five hospital departments of

Table 34.—Private Sanatoriums Classified by States

State	Number of Sanatoriums	Bed Capacity			Patients Admitted			Patients Treated	Average Census	Patients Present
		Adults	Children	Total	Adults	Children	Total			
Alabama	2	105	...	105	178	5	183	241	90	79
Arizona	10	332	25	357	262	50	362*	560	168	149
California	24	1,525	34	1,559	1,142	46	1,772*	2,635	1,065	882
Colorado	15	1,400	76	1,476	719	63	866	1,778	948	925
Connecticut	3	257	...	257	462	4	466	699	226	226
Florida	2	31	...	31	...	...	25*	25	15	...
Illinois	6	517	32	549	672	42	714	1,090	418	426
Louisiana	4	258	16	274	324	18	342	477	147	153
Maine	1	30	...	30	23	1	24	47	19	17
Maryland	3	226	48	274	229	65	294	558	257	277
Massachusetts	9	333	41	374	203	24	235*	460	223	206
Michigan	10	804	51	855	1,078	21	1,099	1,841	757	744
Minnesota	2	53	...	53	31	3	44*	69	22	18
Mississippi	1	45	...	45	29	...	29	58	25	17
Missouri	2	189	32	221	222	35	257	411	165	154
New Hampshire	1	81	25	106	83	20	103	192	83	89
New Jersey	5	236	...	236	173	...	173	304	165	126
New Mexico	3	181	5	186	259	1	260	384	130	133
New York	20	2,402	129	2,531	2,916	182	3,057*	5,294	2,270	2,223
North Carolina	9	333	...	333	386	2	444*	629	181	183
Ohio	5	405	8	413	377	2	492*	848	344	374
Oklahoma	1	25	...	25	111	...	111	124	14	10
Oregon	1	40	...	40	123	3	126	165	28	30
Pennsylvania	7	914	80	994	1,478	41	1,519	2,325	829	836
Rhode Island	1	75	...	75	16	...	16	52	35	33
South Carolina	1	70	...	70	75	...	75	121	44	35
Tennessee	3	275	100	375	200	53	267*	521	257	264
Texas	10	502	...	502	614	3	637*	931	277	238
Virginia	3	110	20	130	224	50	274	409	97	141
Washington	2	130	5	135	222	6	228	360	125	129
West Virginia	2	30	41	71	...	44	44	73	61	41
Wisconsin	2	82	30	112	96	10	106	207	106	99
Totals	170	11,996	798	12,794	12,927	744	14,644*	23,890	9,591	9,257

* Partly unclassified.

5,012 at the end of the year. The county departments, sixty-two in all, have 4,144 beds. They admitted 5,637 patients and treated 8,586. Their census at the end of the twelve months period was 3,017. In sixty-two municipal departments there were 5,273 beds reported, 13,839 admissions, 18,401 patients treated and 4,990 patients under treatment at the time of reporting. The bed capacity in seven departments under city-county management is 1,160. These units had 1,915 admissions in 1938, a total of 2,886 patients treated and 1,011 under treatment at the end of the year. In 244 private departments the bed capacity was 2,708, the annual admission rate 6,880 and the number of patients treated 8,999. The census on the last day of the twelve months period was 1,916.

SUMMARY

1. The present report of tuberculosis facilities in the United States supplements the survey of 1933-1935. It is based on information received from 5,950 hospitals prisons, reformatories, convalescent units and other institutions.

6. There are at present 98,801 beds for tuberculosis, 87,084 for adults and 11,717 for children. The sanatoriums have 70,713 beds, the tuberculosis departments 25,944 and the preventoriums 2,144. In 1935 a total of 95,198 beds were reported, including 11,647 for children.

7. Included in the beds for children are 4,830 for preventorium care. The sanatoriums furnish 2,447 beds for this purpose, the tuberculosis departments 239 and the regular preventoriums 2,144.

8. The sanatoriums, tuberculosis departments and preventoriums admitted 122,342 patients during a twelve months period, discharged 120,366, treated 202,021 and maintained an average occupancy of 79,300. The census at the beginning of the year was 79,679, on the last day 80,403. In 1934 there were 121,706 patients admitted and 81,652 patients present on the day of reporting.

9. The number of children admitted was 13,400, including 8,332 in the sanatoriums, 1,764 in the tuberculosis departments and 3,304 in the preventoriums. The previous survey reported 15,523.

10. The average length of stay in the tuberculosis sanatoriums was 164 days as compared to 166 in 1934. In the tuberculosis departments the average was identical with the previous report of 101 days.

11. The report indicates that 93 per cent of the patients had some form of tuberculous infection. Of this group 6.7 per cent were classified as first infection type, 5.1 per cent as nonpulmonary forms and 88.2 per cent as frank pulmonary tuberculosis. Pulmonary cases of the reinfection type showed the following condition on admission: minimal 12.9 per cent, moderately advanced 32.1 per cent and far advanced 55 per cent. In 1934 the corresponding ratios were 13.1, 29.7 and 57.2 per cent.

12. The waiting list totals 8,797, the number of vacancies 16,254. In the state and city-county sanatoriums and the municipal tuberculosis departments the waiting list exceeds the number of vacancies.

13. Equipment for pneumothorax is provided by 442 sanatoriums and 328 tuberculosis departments. Facilities for outpatient pneumothorax are also included in 361 of the sanatoriums and 222 of the tuberculosis departments. This represents an appreciable increase in the facilities for collapse therapy.

14. Roentgenologic service is available in 410 sanatoriums and 568 tuberculosis departments. In the previous survey, 368 sanatoriums reported x-ray facilities.

15. The present report indicates that 364 sanatoriums and 558 tuberculosis departments have laboratory departments. Apparently no marked change has occurred in this phase of the sanatorium service.

16. Outpatient clinics are now conducted in 264 sanatoriums and 259 tuberculosis departments. Nineteen of the sanatoriums and thirteen of the departments report field clinics.

17. It is hoped that the present report will prove useful to the medical profession and other agencies interested in the prevention, treatment and control of tuberculosis. For comparative data, reference should be made to the survey of 1935.

The preparation of this report would not have been possible without the assistance of the hospital and sanatorium superintendents, whose helpful cooperation in supplying accurate and complete information is highly appreciated. Acknowledgment is also made of the cooperation extended by the National Tuberculosis Association.

Table 35.—Tuberculosis Departments of Hospitals Classified by States and According to Type of Service

State	General				Tuberculosis-Isolation				Nervous and Mental				Orthopedic				Other			
	Number of Sanatoriums	TB Beds	TB Patients Admitted	TB Patients Present	Number of Institutions	TB Beds	TB Patients Admitted	TB Patients Present	Number of Institutions	TB Beds	TB Patients Admitted	TB Patients Present	Number of Institutions	TB Beds	TB Patients Admitted	TB Patients Present	Number of Institutions	TB Beds	TB Patients Admitted	TB Patients Present
Alabama	6	58	146	42	..	..	..	..	..	...	...	...	..	..	..	..	1	50	18	43
Arizona	17	630	1,267	385	..	..	..	..	..	...	...	...	..	..	..	..	..	..	..	..
Arkansas	2	28	54	28	..	..	..	..	2	78	12	28	..	..	..	..	1	22	..	..
California	39	2,487	3,786	1,803	..	..	..	..	1	...	...	...	..	..	..	..	5	66	101	54
Colorado	11	882	1,909	282	..	..	..	..	..	...	...	...	..	..	..	..	3	26	37	27
Connecticut	2	27	105	26	2	58	106	28	1	120	...	115	..	..	..	..	1	8	4	1
Delaware	1	...	...	...	..	..	..	..	1	17	17	...	..	..	..	..	..	..	..	..
District of Columbia	9	338	1,225	314	..	..	..	..	..	...	...	...	..	..	..	..	1	16	27	21
Florida	12	198	325	110	..	..	..	..	1	71	56	53	..	..	..	..	2	57	68	33
Georgia	4	48	222	9	..	..	..	..	..	...	...	...	..	..	..	..	1	6	28	6
Idaho	3	45	50	34	..	..	..	..	..	...	...	...	..	..	..	..	1	..	..	..
Illinois	15	679	1,650	785	..	..	..	..	8	568	152	274	1	200	341	..	2	28	44	25
Indiana	6	108	205	83	..	..	..	..	1	80	19	71	..	..	..	..	1	16	..	..
Iowa	8	10	98	8	..	..	..	..	2	119	63	78	..	..	..	..	4	8	2	..
Kansas	9	110	244	96	..	..	..	..	..	...	...	...	..	..	..	..	2	20	74	..
Kentucky	7	24	284	18	..	..	..	..	4	286	...	148	..	..	..	..	1	15	87	31
Louisiana	7	500	1,981	445	..	..	..	..	..	...	...	...	..	..	..	..	..	..	..	..
Maine	4	37	121	39	..	..	..	..	2	43	22	52	..	..	..	..	1	25	10	10
Maryland	5	326	93	280	..	..	..	..	2	48	6	69	1	..	..	..	2	21	32	14
Massachusetts	10	701	387	285	7	338	411	222	5	229	54	220	2	..	11	69	2	27	22	18
Michigan	13	456	1,143	361	3	1,005	1,637	962	7	497	70	236	..	..	..	..	3	50	86	..
Minnesota	12	543	968	459	..	..	..	..	2	165	64	159	1	..	37	..	1	16	25	16
Mississippi	17	8	114	...	..	..	..	..	1	40	...	36	..	..	..	..	..	..	..	..
Missouri	12	200	461	140	1	60	154	54	2	108	70	35	1	10	62	6	3	41	56	..
Montana	8	43	181	33	1	8	3	..	..	...	...	...	..	..	..	..	..	..	..	..
Nebraska	6	126	163	96	..	..	..	..	1	86	...	...	..	..	..	..	1	5	..	3
Nevada	4	14	38	6	..	..	..	..	..	...	...	...	..	..	..	..	..	..	..	..
New Hampshire	1	...	...	...	..	..	..	..	..	...	...	...	..	..	..	..	..	..	..	..
New Jersey	11	197	917	154	4	525	514	406	5	701	358	571	..	..	..	..	2	12	17	9
New Mexico	9	402	716	275	..	..	..	..	..	...	...	...	..	..	..	..	2	21	37	14
New York	39	2,502	8,032	2,450	5	484	1,029	475	14	1,956	511	1,612	..	..	..	..	2	89	48	148
North Carolina	5	12	147	...	..	..	..	..	..	...	...	...	1	43	..	..	1	24	..	..
North Dakota	7	19	58	2	..	..	..	..	1	4	...	...	..	..	..	..	..	..	..	..
Ohio	18	594	1,646	569	..	..	..	..	6	314	51	179	..	..	..	..	3	10	53	15
Oklahoma	9	216	681	172	..	..	..	..	..	...	...	...	..	..	..	..	1	3	3	1
Oregon	1	3	...	...	..	..	..	..	..	...	...	...	..	..	..	..	1	4	..	4
Pennsylvania	15	763	2,059	564	1	25	7	6	11	807	252	488	1	30	24	..	8	86	143	32
Rhode Island	..	...	...	...	1	60	131	..	1	83	22	50	..	..	..	..	..	..	..	45
South Carolina	3	86	93	45	..	..	..	..	..	...	...	...	..	..	..	..	..	..	..	..
South Dakota	5	38	94	83	..	..	..	..	..	...	...	...	..	..	..	..	..	..	..	..
Tennessee	9	51	264	34	..	..	..	..	2	157	...	83	..	..	..	..	..	..	..	..
Texas	15	477	850	310	..	..	..	..	2	189	...	...	..	..	..	..	..	..	..	..
Utah	4	48	62	40	..	..	..	..	..	...	...	...	..	..	..	..	1	..	..	..
Vermont	1	...	...	...	..	..	..	..	..	...	...	...	..	..	..	..	1	1	1	1
Virginia	7	72	143	35	..	..	..	..	3	228	61	170	..	..	..	..	1	50	26	32
Washington	12	432	590	352	1	250	120	212	3	180	7	6	..	..	..	..	1	6	18	6
West Virginia	4	17	168	7	..	..	..	..	..	...	...	...	..	..	..	..	..	..	..	..
Wisconsin	12	264	978	207	..	..	..	..	..	...	...	...	..	..	..	..	2	6	3	5
Wyoming	3	5	21	4	..	..	..	..	1	15	7	10	..	..	..	..	..	..	..	..
Totals	439	14,824	34,739	11,470	26	2,813	4,112	2,365	92	7,189	1,874	4,743	8	283	475	75	65	835	1,070	614

TUBERCULOSIS SANATORIUMS, DEPARTMENTS AND PREVENTORIUMS

(Sanatoriums 479, Departments 630, Preventoriums 31)

TUBERCULOSIS SANATORIUMS

	Bed Capacity				Admissions													
	Adults	Children	Total	Preventorium Beds[1]	Adults	Children	Total	Daily Average	Patients Treated	Patients Discharged[2]	Deaths	Present Census	Waiting List	Laboratory	X-Ray	Pneumothorax	Tuberculosis Clinics	Nurses	Attendants
ALABAMA																			
County																			
Etowah County Tuberculosis Sanatorium, Alabama City	18	..	18	..	13	..	13	12	20	1	..	14	5	No	Yes	Yes	Yes	3	2
Jefferson Sanatorium, Birmingham	100	..	100	..	..	..	202	71	276	169	35	72	53	Yes	Yes	Yes	Yes	10	..
Morgan County Tuberculosis Sanatorium, Flint	40	..	40	..	120	..	120	26	154	109	3	36	..	....	Yes	Yes	Yes	4	2
Batson Memorial Sanatorium, Lafayette	47	..	47	..	Opened 1939			..	..	..	..	..	..	No	Yes	....	....	..	..
Mobile County Tuberculosis Sanitarium, Mobile	42	12	54	..	28	12	40	51	93	21	13	55	..	No	Yes	Yes	Yes	5	..
Private																			
Susie Parker Stringfellow Memorial Hospital, Anniston	15	..	15	..	53	..	53	14	68	38	..	15	5	No	Yes	Yes	Yes	3	..
Montgomery Tuberculosis Sanatorium, Montgomery	90	..	90	..	125	5	130	76	173	79	30	64	3	Yes	Yes	Yes	Yes	6	8
Totals	352	12	364	..	339	17	558	250	784	417	81	256	66	2	7	6	6	31	12
ARIZONA																			
Federal																			
Kayenta Sanatorium, Kayenta	45	9	54	..	70	4	74	19	77	57	10	19	..	Yes	Yes	Yes	Yes	5	6
Phoenix Indian Sanatorium, Phoenix	60	70	130	70	129	87	216	99	277	203	13	79	..	Yes	Yes	Yes	....	5	12
San Xavier Indian Sanatorium, Tucson	30	16	46	..	26	35	61	43	98	68	..	30	..	Yes	Yes	Yes	....	4	4
Winslow Indian Sanatorium, Winslow	45	6	51	..	78	15	93	49	132	37	3	44	25	Yes	Yes	Yes	Yes	5	10
State																			
State Welfare Sanitarium, Tempe	110	..	110	..	183	..	183	91	243	72	8	104	15	Yes	Yes	Yes	Yes	7	17
Private																			
St. Luke's Home, Phoenix	65	..	65	..	62	..	62	22	96	69	6	15	..	No	Yes	Yes	Yes	5	..
Pamsetgaaf Sanatorium, Prescott	25	..	25	..	..	..	20	..	20	..	..	..	..	Yes	Yes	Yes	....	..	..
Anson Rest Home, Tucson	30	..	30	..	33	..	33	21	53	39	1	16	..	No	No	....	....	5	..
Arizona State Elk's Association Hospital, Tucson	25	..	25	..	14	..	14	14	38	2	1	12	..	No	No	Yes	....	4	2
Barfield Sanitarium, Tucson	22	..	22	..	40	..	40	11	56	38	1	17	..	Yes	Yes	Yes	....	2	..
Comstock Children's Hospital, Tucson	..	25	25	..	..	50	50	20	75	20	1	20	1	No	No	Yes	....	4	2
Hillcrest Sanatorium, Tucson	34	..	34	..	..	..	30	..	30	..	..	..	..	....	....	....	....	..	..
Reardon Sanatorium, Tucson	16	..	16	..	22	..	22	9	29	7	1	7	..	No	No	Yes	....	2	..
St. Luke's in-the-Desert Sanitarium, Tucson	33	..	33	..	37	..	37	20	61	21	..	18	..	No	Yes	Yes	....	2	4
Southern Pacific Sanatorium, Tucson	82	..	82	..	54	..	54	51	102	51	13	44	..	Yes	Yes	Yes	....	6	6
Totals	622	126	748	70	748	191	989	469	1,387	684	58	425	41	8	10	13	4	56	63
ARKANSAS																			
State																			
McRae Memorial Sanatorium, Alexander	32	..	32	..	36	1	37	32	69	16	11	33	279	Yes	Yes	Yes	Yes	4	1
Arkansas Tuberculosis Sanatorium, State Sanatorium	695	95	700	..	634	265	899	667	1,596	726	28	786	379	Yes	Yes	Yes	Yes	108	35
Totals	637	95	732	..	670	266	936	699	1,665	742	39	819	659	2	2	2	2	112	36
CALIFORNIA																			
Federal																			
Veterans Admin. Facility, Livermore	312	..	312	..	408	..	408	275	687	360	83	258	6	Yes	Yes	Yes	....	31	47
Veterans Admin. Facility, San Fernando	230	..	230	..	242	..	242	238	492	219	34	237	31	Yes	Yes	Yes	Yes	28	35
County																			
Ahwahnee Tri-County Tuberculosis Sanatorium, Ahwahnee	98	26	124	26	..	..	122	114	244	..	..	120	10	Yes	Yes	Yes	Yes	12	..
Wish-I-ah Sanatorium, Auberry	26	40	66	4	28	41	69	69	140	73	..	65	..	Yes	Yes	Yes	Yes	5	4
Humboldt County School for the Tuberculous, Eureka	65	..	65	..	77	17	94	51	144	37	12	44	..	Yes	Yes	Yes	....	6	..
Stony Brook Retreat, Keene	103	..	103	..	97	1	98	100	196	81	17	100	18	Yes	Yes	Yes	....	9	5
Arroyo-Del Valle Sanatorium, Livermore✦	157	66	223	42	177	125	302	204	488	271	10	207	..	Yes	Yes	Yes	Yes	24	16
Bret Harte Sanatorium, Murphys✦	94	65	159	65	122	72	194	156	354	169	9	163	..	Yes	Yes	Yes	Yes	11	5
Olive View Sanatorium, Olive View✦	833	184	1,017	..	704	52	756	985	1,686	676	60	948	127	Yes	Yes	Yes	....	117	115
Pauling Rest Home, San Fernando	55	..	55	..	66	..	66	50	116	20	27	52	..	No	Yes	Yes	....	5	4
Santa Clara County Sanatorium, San Jose✦	45	..	45	..	198	9	207	119	309	148	28	110	13	Yes	Yes	Yes	Yes	103	54
San Luis Obispo County Tuberculosis Sanatorium, San Luis Obispo	20	..	20	..	32	3	35	26	56	21	8	20	..	No	No	Yes	....	3	3
Tulare-Kings Counties Joint Tuberculosis Hospital, Springville	104	54	158	40	93	59	152	121	253	105	8	124	12	Yes	Yes	Yes	Yes	13	6
Weimar Joint Sanatorium, Weimar	414	66	480	..	428	53	481	465	952	319	121	473	13	Yes	Yes	Yes	Yes	19	37
City-County																			
Hassler Health Home, Redwood City	111	..	111	..	145	..	145	95	235	134	..	101	..	Yes	Yes	Yes	....	6	5
Private																			
Our Lady of Lourdes Sanatorium, Alta Loma	25	..	25	..	15	..	15	15	28	3	2	10	..	No	No	Yes	Yes	2	1
Southern Sierras Sanatorium, Banning	35	..	35	..	10	1	11	16	29	13	2	16	..	Yes	Yes	Yes	....	2	2
California Sanatorium, Belmont	90	10	100	5	157	29	186	84	268	103	13	81	..	Yes	Yes	Yes	....	8	..
Colfax School for the Tuberculous, Colfax	50	..	50	..	..	..	53	15	53	..	6	..	..	Yes	Yes	Yes	Yes	2	..
Los Angeles Sanatorium, Duarte✦	170	..	170	..	103	..	103	156	255	59	44	153	40	Yes	Yes	Yes	Yes	7	24
Mulrose Sanatorium, Duarte	24	..	24	..	24	..	24	14	42	14	5	16	..	No	Yes	Yes	....	2	2
Santa Teresita Sanatorium, Duarte	100	..	100	..	30	8	38	98	110	12	6	100	..	No	No	Yes	....	..	1
Hillcrest Sanatorium, La Crescenta	45	..	45	..	..	..	150	20	150	..	..	..	..	Yes	Yes	Yes	....	..	..
Antelope Valley Sanatorium and Hospital, Lancaster	118	..	118	..	..	..	110	113	110	..	21	..	..	No	Yes	....	....	5	5
La Vina Sanatorium, La Vina	50	24	74	24	85	..	85	45	127	73	13	40	4	Yes	Yes	Yes	Yes	10	..
Barlow Sanatorium, Los Angeles✦	100	..	100	..	80	..	80	96	174	86	..	97	3	Yes	Yes	Yes	Yes	14	8
Belvedere Sanitorium, Los Angeles	40	..	40	..	..	..	86	..	86	..	..	..	..	....	....	....	....	..	..
Doughty Sanatorium, Los Angeles	14	..	14	..	38	1	39	11	53	28	6	12	..	....	....	....	....	1	2
Ex-Patients Home of the Jewish Consumptive Relief Association, Los Angeles	70	..	70	..	80	..	80	66	143	77	4	62	..	Yes	Yes	Yes	Yes	5	..
Oak's Sanitarium, Los Gatos[3]	60	..	60	..	52	..	52	28	80	24	4	18	..	Yes	Yes	Yes	Yes	4	..

1. Included in beds for children. 2. Does not include deaths. 3. Closed December 1, 1939. ✦ Approved for Residencies in Tuberculosis.

TUBERCULOSIS SANATORIUMS—Continued

	Bed Capacity				Admissions													
	Adults	Children	Total	Preventorium Beds[1]	Adults	Children	Total	Daily Average	Patients Treated	Patients Discharged[2]	Deaths	Present Census	Waiting List	Laboratory	X-Ray	Pneumothorax	Tuberculosis Clinics	Nurses	Attendants
CALIFORNIA—Continued																			
Arequipa Sanatorium, Manor	46	..	46	..	67	..	67	42	110	80	1	32	..	Yes	Yes	Yes	....	5	1
Maryknoll Sanatorium, Monrovia	40	..	40	..	35	..	35	30	58	17	4	36	3	Yes	Yes	Yes	....	7	..
Dore Sanatorium, Monrovia	58	..	58	..	..	..	98	..	98	..	..	..	..	....	....	....	....	..	..
Norumbega Sanatorium, Monrovia	20	..	20	..	..	..	87	11	87	..	6	..	..	Yes	Yes	....	....	..	..
Pottenger Sanatorium and Clinic, Monrovia✚	120	..	120	..	83	4	87	62	161	76	16	61	..	Yes	Yes	Yes	Yes	10	..
Independent Order of Foresters California Tuberculosis Sanatorium, Pacoima	100	..	100	..	15	..	15	20	35	6	2	20	..	No	No	Yes	....	5	1
Canyon Sanatorium, Redwood City	50	..	50	..	60	2	62	27	85	48	4	27	..	Yes	Yes	Yes	....	5	1
Alum Rock Sanatorium, San Jose	40	..	40	..	134	1	135	40	164	114	8	43	5	Yes	Yes	Yes	Yes	3	4
Sunland Sanatorium, Sunland	60	..	60	..	74	..	74	56	129	47	9	58	..	No	Yes	Yes	....	7	2
Totals	4,192	535	4,727	206	3,959	478	5,143	4,123	8,987	3,513	593	3,904	285	28	32	34	17	491	390
COLORADO																			
Private																			
Mesa Vista Sanatorium, Boulder	40	5	45	..	25	6	31	28	31	20	9	32	..	No	No	Yes	....	1	5
Cragmor Sanatorium, Colorado Springs	130	..	130	..	..	..	56	27	56	..	..	..	..	Yes	Yes	Yes	....	..	..
Sunnyrest Sanatorium, Colorado Springs	50	..	50	..	..	..	15	..	15	..	..	..	..	....	....	Yes	....	..	..
Bethesda Sanatorium, Denver	55	13	68	13	38	13	51	26	74	30	7	37	..	Yes	Yes	Yes	Yes	3	4
Costello Home, Denver	16	..	16	..	4	..	4	10	16	5	..	7	..	No	No	Yes	Yes	1	..
Ex-Patients' Tubercular Home, Denver	76	..	76	..	15	..	15	50	66	17	2	42	5	Yes	Yes	Yes	Yes	2	1
National Jewish Hospital, Denver✚	188	58	246	36	121	41	162	242	409	147	21	241	32	Yes	Yes	Yes	Yes	3	36
Oakes Home Sanitarium, Denver	75	..	75	..	66	..	66	26	90	26	8	27	..	No	No	Yes	....	10	3
St. Francis Sanatorium, Denver	16	..	16	..	21	..	21	14	35	16	4	15	5	No	No	Yes	....	3	1
Sands House, Denver	48	..	48	..	19	..	19	36	50	24	9	30	..	Yes	Yes	Yes	....	..	2
Craig Colony, Edgewater	51	..	51	..	21	..	21	44	64	18	10	40	..	Yes	Yes	Yes	....	3	..
Swedish National Sanatorium, Englewood	90	..	90	..	82	..	82	51	141	63	23	51	..	Yes	Yes	Yes	....	3	..
Sanatorium of the Jewish Consumptive's Relief Society, Spivak✚	300	..	300	..	134	..	134	215	351	126	19	224	108	Yes	Yes	Yes	Yes	29	..
Evangelical Lutheran Sanitarium, Wheat Ridge	110	..	110	..	60	1	61	88	146	44	16	85	5	Yes	Yes	Yes	....	11	..
Modern Woodmen of America Sanatorium, Woodmen	155	..	155	..	126	2	128	91	234	141	12	94	18	Yes	Yes	Yes	Yes	8	3
Totals	1,400	76	1,476	49	719	63	866	948	1,778	677	140	925	173	10	10	15	6	77	55
CONNECTICUT																			
State																			
Cedarcrest Sanatorium, Hartford	223	..	223	..	190	..	190	247	449	175	58	222	..	Yes	Yes	Yes	....	31	10
Undercliff, Meriden State Tuberculosis Sanatorium, Meriden	...	252	252	..	63	77	140	191	330	143	15	189	17	Yes	Yes	Yes	Yes	27	2
Norwich State Tuberculosis Sanatorium, Norwich✚	404	..	404	..	272	..	272	392	659	207	58	394	65	No	Yes	Yes	Yes	73	9
Laurel Heights State Tuberculosis Sanatorium, Shelton	350	..	350	..	248	..	248	344	586	183	63	343	139	Yes	Yes	Yes	Yes	75	7
The Seaside, Waterford	...	175	175	..	7	15	22	140	167	16	3	135	..	Yes	Yes	No	Yes	9	..
Private																			
Wildwood Sanatorium, Hartford	50	..	50	..	74	..	74	30	113	81	3	30	..	Yes	Yes	Yes	....	331	50
Gaylord Farm Sanatorium, Wallingford✚	145	..	145	..	208	4	212	140	345	203	7	135	..	Yes	Yes	Yes	Yes	14	2
William Wirt Winchester Hospital, West Haven	62	..	62	..	180	..	180	56	241	162	18	61	..	Yes	Yes	Yes	Yes	18	..
Totals	1,234	427	1,661	..	1,242	96	1,338	1,540	2,890	1,170	225	1,509	221	7	8	7	6	578	80
DELAWARE																			
State																			
Brandywine Sanatorium, Marshallton	124	36	160	..	75	11	86	140	221	58	23	137	16	Yes	Yes	Yes	Yes	10	24
Edgewood Sanatorium, Marshallton	30	10	40	10	26	2	28	33	64	19	16	34	25	No	No	Yes	....	6	..
Totals	154	46	200	10	101	13	114	173	285	77	39	171	41	1	1	2	1	16	24
DISTRICT OF COLUMBIA																			
City																			
Tuberculosis Sanatorium (Glendale, Md., P.O.)✚	400	300	700	..	652	..	652	515	1,046	464	116	580	..	Yes	Yes	Yes	....	58	..
FLORIDA																			
State																			
Florida State Sanatorium, Orlando	318	..	318	..	467	1	468	313	784	103	51	316	..	Yes	Yes	Yes	....	50	3
County																			
St. Johns County Welfare Home for Tuberculosis Patients, St. Augustine	12	..	12	..	..	..	8	..	8	..	..	..	..	....	....	....	....	..	..
Hillsboro County Tuberculosis Sanatorium, Tampa	80	..	80	..	121	2	123	65	263	79	..	66	..	No	No	Yes	....	6	8
City-County																			
Negro Tuberculosis Hospital, Jacksonville	50	..	50	..	140	..	140	48	187	11	74	50	10	No	No	No	....	3	4
Escambia County Tuberculosis Sanatorium, Pensacola	34	22	56	22	58	27	88	52	124	26	10	51	9	Yes	Yes	Yes	Yes	5	10
Private																			
Hazelhurst Sanatorium, Jacksonville	21	..	21	..	..	..	25	15	25	..	..	..	..	No	No	....	....	..	..
Palm Beach County Tuberculosis Sanatorium for Negroes, West Palm Beach	10	..	10	..	..	..	..	..	..	..	..	..	..	....	....	....	....	..	..
Totals	525	22	547	22	786	30	852	493	1,391	219	135	483	19	2	2	3	1	64	25
GEORGIA																			
State																			
State Tuberculosis Sanatorium, Alto	232	96	328	72	515	70	585	260	879	586	16	259	575	Yes	Yes	Yes	Yes	18	18
County																			
Muscogee County Tuberculosis Sanatorium, Columbus	48	..	48	..	34	..	34	20	47	45	..	17	..	Yes	Yes	Yes	Yes	1	2
City-County																			
Battle Hill Sanatorium, Atlanta	177	79	256	79	143	26	169	235	408	100	46	231	250	Yes	Yes	Yes	....	7	23
Hopewell Sanatorium, Macon	27	..	27	..	35	2	37	26	61	29	6	26	..	Yes	Yes	Yes	Yes	..	4
Totals	484	175	659	151	727	98	825	541	1,395	760	68	533	825	4	4	4	3	26	47
IDAHO																			
Federal																			
Fort Lapwai Sanatorium, Lapwai	..	132	132	66	..	203	203	125	280	120	5	127	32	Yes	Yes	Yes	....	8	6

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TUBERCULOSIS SANATORIUMS—Continued

	Bed Capacity				Admissions													
	Adults	Children	Total	Preventorium Beds[1]	Adults	Children	Total	Daily Average	Patients Treated	Patients Discharged[2]	Deaths	Present Census	Waiting List	Laboratory	X-Ray	Pneumothorax	Tuberculosis Clinics	Nurses	Attendants
ILLINOIS																			
County[4]																			
Kane County Springbrook Sanitarium, Aurora	73	6	79	..	64	6	70	76	150	66	15	75	10	Yes	Yes	Yes	Yes	5	5
Elmgrove Sanatorium, Bushnell	40	..	40	..	40	1	41	31	69	25	7	28	2	Yes	Yes	Yes	Yes	4	3
Macon County Tuberculosis Sanatorium, Decatur✚	80	..	80	..	68	..	68	68	139	72	3	67	..	Yes	Yes	Yes	Yes	6	..
DeKalb County Tuberculosis Sanatorium, DeKalb	32	..	32	..	37	..	37	25	47	8	3	23	..	Yes	Yes	Yes	Yes	3	2
Madison County Tuberculosis Sanitarium, Edwardsville	85	8	93	..	108	5	113	78	187	85	11	73	..	Yes	Yes	Yes	Yes	5	14
Morgan County Tuberculosis Sanatorium "Oaklawn," Jacksonville	40	..	40	..	40	..	40	41	56	28	7	22	..	Yes	Yes	Yes	Yes	3	2
Will County Tuberculosis Sanatorium, Joliet	96	..	96	..	67	..	67	82	152	36	32	84	..	Yes	Yes	Yes	Yes	4	7
Oak Knoll Sanatorium, Mackinaw	45	..	45	..	41	..	41	37	76	25	4	34	..	No	Yes	Yes	Yes	1	5
Woodford County Tuberculosis Sanatorium, Minonk	10	..	10	..	10	..	10	5	15	11	3	6	..	Yes	No	....	....	2	..
Fairview Sanatorium, Normal	50	..	50	..	35	..	35	41	76	27	7	44	8	No	Yes	Yes	Yes	5	4
Cook County Tuberculosis Hospital, Oak Forest	593	41	634	41	489	23	512	458	942	350	134	447	..	Yes	Yes	Yes	....	8	97
Highland, Ottawa[3]	54	..	54	..	..	..	41	41	41	..	..	..	..	Yes	Yes	Yes	Yes	2	6
Livingston County Sanatorium, Pontiac	34	..	34	..	43	6	49	29	79	41	4	34	..	No	Yes	Yes	Yes	4	..
Hillcrest, Quincy	50	..	50	..	33	..	33	45	83	31	5	36	..	Yes	Yes	Yes	....	5	4
Rock Island County Tuberculosis Sanatorium, Rock Island	76	..	76	..	82	..	82	65	148	70	17	60	..	Yes	Yes	Yes	Yes	8	..
The Outlook, Urbana	48	..	48	..	37	1	38	35	74	30	6	39	3	No	Yes	Yes	Yes	7	..
Lake County Sanatorium, Waukegan	92	..	92	..	Opened September 23, 1939			..	..	..	..	..	..	Yes	Yes	Yes	....	..	..
City																			
City of Chicago Municipal Tuberculosis Sanitarium, Chicago	1,105	96	1,201	..	883	520	1,403	1,178	2,574	1,374	257	1,174	..	Yes	Yes	Yes	Yes	112	34
Municipal Tuberculosis Home, North Riverside	265	..	265	..	231	..	231	220	447	234	6	215	..	....	Yes	Yes	....	8	3
Peoria Municipal Tuberculosis Sanitarium, Peoria✚	93	..	93	..	160	7	167	88	256	148	15	88	..	Yes	Yes	Yes	Yes	13	..
Rockford Municipal Tuberculosis Sanatorium, Rockford✚	120	..	120	..	154	..	154	102	248	83	20	98	..	Yes	Yes	Yes	Yes	11	2
Private																			
Fox River Sanitarium, Batavia	85	..	85	..	100	..	100	53	148	60	10	61	6	Yes	Yes	Yes	Yes	2	4
Edward Sanatorium, Naperville	97	..	97	..	201	..	201	73	277	199	16	78	..	Yes	Yes	Yes	Yes	19	2
Ottawa Tuberculosis Sanatorium, Ottawa	133	..	133	..	181	6	187	119	282	122	33	126	5	Yes	Yes	Yes	Yes	3	..
Palmer Sanatorium, Springfield	74	..	74	..	55	1	56	63	109	47	9	61	..	Yes	Yes	Yes	Yes	4	10
Winfield Sanatorium, Winfield	78	32	110	32	100	35	135	80	202	137	13	65	..	Yes	Yes	Yes	Yes	..	6
Zace Sanatorium, Winfield	50	..	50	..	35	..	35	30	72	30	7	35	..	Yes	Yes	Yes	....	6	..
Totals	3,598	183	3,781	73	3,294	611	3,946	3,164	6,949	3,339	644	3,073	34	22	26	26	21	250	210
INDIANA																			
State																			
Indiana State Sanatorium, Rockville	250	..	250	..	129	47	223	214	425	275	15	150	300	Yes	Yes	Yes	Yes	8	17
County																			
Ella B. Kehrer Hospital, Anderson	50	25	75	25	50	10	60	33	95	29	2	33	..	No	Yes	Yes	....	3	..
Lake County Tuberculosis Sanatorium, Crown Point	190	10	200	..	353	38	391	197	596	156	42	200	88	Yes	Yes	Yes	Yes	12	29
Boehne Tuberculosis Hospital, Evansville✚	115	15	130	..	257	99	356	128	500	222	28	119	..	Yes	Yes	Yes	Yes	4	25
Irene Byron Sanatorium, Fort Wayne	207	30	237	..	..	..	291	201	480	272	63	208	..	Yes	Yes	Yes	Yes	32	4
Sunnyside Sanatorium, Indianapolis✚	238	12	250	..	49	2	51	37	86	40	12	35	..	Yes	Yes	Yes	Yes	8	3
William Ross Sanatorium, Lafayette	41	..	41	..	212	25	237	245	495	211	55	229	22	Yes	Yes	Yes	....	11	22
Smith-Esteb Memorial Hospital, Richmond	51	..	51	..	44	1	45	28	72	37	5	30	..	Yes	Yes	Yes	....	3	4
Healthwin Hospital, South Bend	165	50	215	..	180	93	273	198	454	226	37	191	..	Yes	Yes	Yes	Yes	10	20
Hillcrest Tuberculosis Hospital, Vincennes	66	..	66	..	64	..	64	27	83	15	10	30	..	Yes	Yes	Yes	Yes	4	2
Totals	1,373	142	1,515	25	1,338	315	1,991	1,308	3,286	1,483	269	1,225	410	9	10	10	7	95	116
IOWA																			
Federal																			
Sac and Fox Sanatorium, Toledo	70	..	70	..	24	10	34	64	103	49	2	54	..	Yes	Yes	Yes	....	6	4
State																			
State Sanatorium, Oakdale	420	..	420	..	291	..	291	389	642	189	44	409	53	Yes	Yes	Yes	Yes	10	46
County																			
Pine Knoll Sanitarium, Davenport	80	20	100	..	93	29	122	77	197	112	14	77	..	Yes	Yes	Yes	....	7	4
Broadlawns Polk County Public Hospital, Des Moines	100	..	100	..	90	2	92	56	144	62	25	57	..	Yes	Yes	Yes	Yes	6	4
Sunny Crest Sanatorium, Dubuque	70	..	70	..	88	..	88	66	152	17	17	63	..	Yes	Yes	Yes	Yes	4	..
Sunnyslope Sanatorium, Ottumwa	65	35	100	..	72	24	96	106	202	90	22	87	3	Yes	Yes	Yes	Yes	6	15
Totals	805	55	860	..	658	65	723	758	1,524	519	124	822	56	6	6	6	4	39	73
KANSAS																			
State																			
Kenney Memorial Hospital, Norton	253	..	253	..	New Unit of State Sanatorium for Tuberculosis, Norton														
State Sanatorium for Tuberculosis, Norton	266	24	290	..	198	30	228	323	558	183	53	325	..	Yes	Yes	Yes	Yes	..	..
County																			
Sedgwick County Tuberculosis Sanitarium, Wichita	60	..	60	..	47	..	47	45	94	41	15	38	..	No	No	Yes	....	7	..
City-County																			
Hillcrest Sanatorium, Topeka	50	20	70	10	90	121	211	55	268	212	28	50	..	Yes	Yes	Yes	....	9	5
Totals	629	44	673	10	335	151	486	423	920	436	96	413	..	2	2	3	1	16	5
KENTUCKY																			
Federal																			
Veterans Administration Facility, Outwood	322	..	322	..	639	..	639	248	919	568	85	289	..	Yes	Yes	Yes	....	37	49
State																			
State Tuberculosis Sanatorium, Louisville	125	5	130	..	227	1	228	91	289	188	11	107	..	Yes	Yes	Yes	Yes	13	13
County																			
Covington-Kenton County Tuberculosis Hospital, Covington	17	..	17	..	..	..	19	..	19	..	..	..	..	No	No	Yes	....	..	..
Julius Mark Sanatorium, Lexington	72	22	94	22	117	31	148	93	242	135	13	94	4	Yes	Yes	Yes	....	3	11
City-County																			
Waverly Hills Sanatorium, Waverly Hills	422	98	520	98	377	127	504	490	996	379	112	499	..	Yes	Yes	Yes	Yes	16	82
Totals	958	125	1,083	120	1,360	159	1,538	922	2,465	1,270	221	989	4	4	4	5	2	69	155

1. Included in beds for children. 2. Does not include deaths. 3. Eighty-five bed addition under construction. 4. St. Clair County Sanatorium, East St. Louis, 105 beds. Now under construction. ✚ Approved for Residencies in Tuberculosis.

TUBERCULOSIS SANATORIUMS—Continued

	Bed Capacity				Admissions													
	Adults	Children	Total	Preventorium Beds[1]	Adults	Children	Total	Daily Average	Patients Treated	Patients Discharged[2]	Deaths	Present Census	Waiting List	Laboratory	X-Ray	Pneumothorax	Tuberculosis Clinics	Nurses	Attendants
LOUISIANA																			
State																			
Greenwell Springs Sanatorium, Greenwell Springs	111	..	111	..	79	..	79	97	170	29	23	108	259	No	Yes	Yes	....	2	15
Private																			
Cooley Sanatorium, Monroe	48	..	48	..	Opened October 30, 1939								..	Yes	Yes	Yes	....	..	..
Orleans Tuberculosis Hospital, New Orleans	100	..	100	..	122	..	122	54	176	12	36	54	..	Yes	Yes	No	....	5	6
Gowen Sanatorium, Shreveport	22	..	22	..	87	..	87	13	97	43	5	20	..	Yes	Yes	Yes	Yes	2	5
Pines Sanatorium, Shreveport	88	16	104	16	115	18	133	80	206	80	45	79	..	Yes	Yes	Yes	Yes	5	5
Totals	369	16	385	16	403	18	421	244	649	164	109	261	259	4	5	4	2	14	31
MAINE																			
State																			
Central Maine Sanatorium, Fairfield	186	..	186	..	173	..	173	182	359	136	40	179	11	Yes	Yes	Yes	Yes	26	6
Western Maine Sanatorium, Greenwood Mountain✚	126	24	150	..	138	36	174	140	318	145	16	142	2	Yes	Yes	Yes	Yes	12	7
Northern Maine Sanatorium, Presque Isle	87	32	119	..	124	..	124	113	235	104	17	114	8	Yes	Yes	Yes	....	13	3
Private																			
Bangor Sanatorium, Bangor	30	..	30	..	23	1	24	19	47	28	2	17	1	Yes	Yes	Yes	Yes	3	1
Totals	429	56	485	..	458	37	495	454	959	413	75	452	22	4	4	4	3	54	17
MARYLAND																			
State																			
Maryland Tuberculosis Sanatorium, Henryton	174	96	270	..	204	103	307	224	532	186	88	259	169	Yes	Yes	Yes	Yes	36	21
Maryland Tuberculosis Sanatorium, Mt. Wilson Branch, Mt. Wilson	177	..	177	..	183	13	196	176	370	150	37	182	..	Yes	Yes	Yes	Yes	16	19
Maryland Tuberculosis Sanatorium, Eastern Shore Branch, Salisbury	75	..	75	..	104	4	108	57	160	85	24	64	1	Yes	Yes	Yes	Yes	3	3
Maryland Tuberculosis Sanatorium, State Sanatorium	460	50	510	.. ..	677	..	677	502	1,177	672	90	504	30	Yes	Yes	Yes	....	51	65
Private																			
Allegany County Tuberculosis Sanatorium, Cumberland	24	..	24	..	18	..	18	9	34	5	5	8	..	No	No	Yes	Yes	..	..
Mount Pleasant, Reisterstown	60	..	60	..	42	..	42	57	99	35	7	57	..	Yes	Yes	Yes	....	8	..
Hospital for Consumptives, Towson	142	90	190	..	169	65	234	191	425	227	41	212	..	Yes	Yes	Yes	....	42	6
Totals	1,112	194	1,306	..	1,397	185	1,582	1,216	2,797	1,321	292	1,286	200	6	6	7	4	156	114
MASSACHUSETTS																			
State																			
Lakeville State Sanatorium, Middleboro	125	177	302	..	125	55	180	237	413	176	13	229	..	Yes	Yes	No	Yes	24	71
North Reading State Sanatorium, North Wilmington✚	...	297	297	..	..	181	181	242	432	168	15	245	..	Yes	Yes	Yes	Yes	31	41
Rutland State Sanatorium, Rutland✚	370	..	370	..	246	..	246	340	608	242	56	335	..	Yes	Yes	Yes	Yes	42	29
Westfield State Sanatorium, Westfield	189	..	189	..	214	24	238	196	379	162	32	181	..	Yes	Yes	Yes	Yes	47	44
County																			
Bristol County Tuberculosis Hospital, Attleboro	60	..	60	..	140	..	140	63	200	45	27	64	..	Yes	Yes	Yes	Yes	6	8
Hampshire County Sanatorium, Haydenville	100	..	100	..	87	..	87	82	165	73	27	68	..	Yes	Yes	Yes	Yes	13	..
Essex Sanatorium, Middleton	360	..	360	..	308	..	308	343	640	265	82	335	..	Yes	Yes	Yes	Yes	26	40
Norfolk County Hospital, South Braintree✚	150	..	150	..	139	..	139	147	278	81	51	152	1	Yes	Yes	Yes	Yes	18	21
Plymouth County Hospital, South Hanson✚	125	15	140	..	63	3	66	103	167	37	24	99	3	Yes	Yes	Yes	Yes	19	15
Middlesex County Sanatorium, Waltham✚	400	..	400	..	328	..	328	372	708	274	85	349	..	Yes	Yes	Yes	Yes	27	38
Worcester County Sanatorium, Worcester	130	..	130	..	95	..	95	122	214	79	30	105	..	Yes	Yes	Yes	Yes	25	2
City																			
Sanatorium Division of Boston City Hospital, Boston✚	616	..	616	..	529	..	529	547	1,082	372	160	529	..	Yes	Yes	Yes	Yes	91	6
Cambridge Sanatorium, Cambridge	80	..	80	..	96	..	96	50	151	51	23	52	..	No	No	Yes	Yes	6	5
Private																			
Channing Home, Boston	27	..	27	..	29	..	29	26	52	46	1	26	..	Yes	Yes	Yes	....	4	2
Sassaquin Sanatorium, New Bedford	95	21	116	..	92	9	101	106	205	85	17	103	..	Yes	Yes	Yes	Yes	6	6
Frederic S. Coolidge Memorial Hospital, Pittsfield	8	..	8	..	4	..	4	5	9	12	..	3	..	No	Yes	Yes	....	1	..
Pittsfield Anti-Tuberculosis Hospital, Pittsfield	14	..	14	..	12	..	12	9	22	7	3	8	..	No	Yes	Yes	Yes	1	1
Jewish Tuberculosis Sanatorium, Rutland	30	..	30	..	29	..	29	22	46	22	5	21	..	Yes	Yes	Yes	....	2	2
Rutland Training Center, Rutland	75	..	75	..	8	..	8	23	39	18	1	21	..	Yes	Yes	Yes	Yes	3	2
Rutland Cottage Sanatoria, Rutland	34	..	34	..	11	..	11	9	22	14	1	8	..	Yes	Yes	Yes	Yes	..	..
Balfour Sanatorium, Sharon	20	..	20	..	..	..	8	..	8	..	..	..	..	....	....	....	....	..	..
Sharon Sanatorium, Sharon	30	20	50	..	18	15	33	23	57	25	1	16	..	Yes	Yes	Yes	Yes	5	2
Totals	3,038	530	3,568	..	2,573	287	2,868	3,067	5,897	2,254	663	2,949	4	18	20	20	18	397	335
MICHIGAN																			
State																			
American Legion Hospital, Battle Creek✚	350	..	350	..	203	..	203	217	408	197	50	205	..	Yes	Yes	Yes	....	24	20
Northern Michigan Tuberculosis Sanatorium, Gaylord	90	..	90	..	122	6	128	72	174	27	11	80	20	Yes	Yes	Yes	Yes	12	8
Michigan State Sanatorium, Howell✚	400	80	480	..	252	39	291	428	728	263	47	412	..	Yes	Yes	Yes	Yes	33	37
County																			
Lenawee County Tuberculosis Sanatorium, Adrian	28	..	28	..	11	..	11	25	11	7	4	28	..	No	Yes	Yes	Yes	2	3
Calhoun County Public Hospital, Battle Creek	75	..	75	..	65	3	68	51	113	54	9	45	5	Yes	Yes	Yes	Yes	11	1
Copper Country Sanatorium, Houghton	53	..	53	..	32	..	32	52	84	32	8	52	15	No	Yes	Yes	Yes	6	..
Jackson County Sanatorium, Jackson	56	8	64	..	59	5	64	60	128	49	6	69	6	Yes	Yes	Yes	Yes	17	..
Ingham Sanatorium, Lansing✚	115	..	115	..	203	3	206	84	297	150	22	108	..	Yes	Yes	Yes	Yes	11	11
Morgan Heights Sanatorium, Marquette✚	55	35	90	35	92	13	105	79	175	75	23	72	..	Yes	Yes	Yes	Yes	14	2
Muskegon County Sanatorium, Muskegon	64	6	70	..	57	3	60	68	124	40	17	67	4	Yes	Yes	Yes	Yes	10	1
Oakland County Tuberculosis Sanatorium, Pontiac✚	193	..	193	..	225	14	239	187	426	211	24	186	..	Yes	Yes	Yes	Yes	25	12
Pinecrest Sanatorium, Powers	140	..	140	..	136	4	140	106	235	71	41	133	..	Yes	Yes	Yes	Yes	22	2
Ontonagon County Sanatorium, Rockland	20	..	20	..	20	1	21	15	36	7	5	19	..	No	No	Yes	....	2	..
City																			
Sunshine Sanatorium, Grand Rapids	145	..	145	..	143	..	143	122	252	145	33	107	..	No	Yes	Yes	Yes	14	15
William H. Maybury Sanatorium, Northville✚	683	160	843	..	513	160	673	799	1,437	562	109	766	..	Yes	Yes	Yes	....	104	61
Private																			
Bethesda Hospital, Detroit	83	..	83	..	163	..	163	76	246	94	65	76	..	Yes	Yes	Yes	Yes	8	14
Burns Home Sanatorium, Detroit	83	..	83	..	145	..	145	70	208	138	..	70	..	No	Yes	Yes	....	2	7
Chenik Hospital, Detroit	54	..	54	..	101	..	101	48	150	63	30	46	..	Yes	Yes	Yes	....	6	2

1. Included in beds for children. 2. Does not include deaths. ✚ Approved for Residencies in Tuberculosis.

TUBERCULOSIS SANATORIUMS—Continued

	Bed Capacity				Admissions													
MICHIGAN—Continued	Adults	Children	Total	Preventorium Beds[1]	Adults	Children	Total	Daily Average	Patients Treated	Patients Discharged[2]	Deaths	Present Census	Waiting List	Laboratory	X-Ray	Pneumothorax	Tuberculosis Clinics	Nurses	Attendants
Detroit Tuberculosis Sanatorium, Detroit	120	30	150	..	207	..	207	136	339	206	28	133	..	Yes	Yes	Yes	....	7	11
Fairview Sanatorium, Detroit	66	..	66	..	71	4	75	63	141	43	32	64	..	Yes	Yes	Yes	Yes	5	8
Good Samaritan Hospital, Detroit	29	..	29	..	60	..	60	25	88	34	29	25	..	Yes	Yes	Yes	Yes	3	2
East Lawn Sanatorium, Northville	95	..	95	..	69	..	69	95	163	45	22	95	..	Yes	Yes	Yes	....	10	..
Pine Crest Sanatorium, Oshtemo	109	21	130	..	74	17	91	124	214	76	19	119	..	Yes	Yes	Yes	Yes	7	11
Wehenkel Convalescent Home, Romeo	40	..	40	..	92	..	92	35	125	89	2	35	..	Yes	Yes	Yes	....	1	4
Leland Sanatorium, Ypsilanti	125	..	125	..	96	..	96	85	167	66	20	81	..	Yes	Yes	Yes	....	3	8
Totals	3,271	340	3,611	35	3,211	272	3,483	3,122	6,469	2,744	605	3,102	50	20	24	25	16	359	240
MINNESOTA																			
State																			
Minnesota State Sanatorium, Ah-gwah-ching	480	..	480	..	421	47	468	381	816	358	101	397	6	Yes	Yes	Yes	....	43	36
County																			
Otter Tail County Sanatorium, Battle Lake	42	..	42	..	40	..	40	35	71	19	6	33	..	Yes	Yes	Yes	....	5	..
Mineral Springs Sanatorium, Cannon Falls	100	..	100	..	58	..	58	95	149	37	14	96	..	Yes	Yes	Yes	....	13	..
Sunnyrest Sanatorium, Crookston	72	..	72	..	65	1	66	66	126	58	12	56	..	Yes	Yes	Yes	Yes	9	..
Deerwood Sanatorium, Deerwood	26	..	26	..	26	..	26	25	51	20	1	27	1	No	Yes	Yes	Yes	4	..
Riverside Sanatorium, Granite Falls	54	..	54	..	25	..	25	45	72	26	3	43	..	Yes	Yes	Yes	Yes	8	..
Sand Beach Sanatorium, Lake Park	46	..	46	..	14	..	14	43	59	12	2	43	2	No	Yes	Yes	Yes	6	..
Nopeming Sanatorium, Nopeming✚	220	15	235	..	156	8	164	237	403	148	22	233	8	Yes	Yes	Yes	Yes	27	15
Glen Lake Sanatorium, Oak Terrace✚	640	60	700	69	444	16	460	642	1,129	460	100	620	..	Yes	Yes	Yes	....	81	49
Lake Julia Tuberculosis Sanatorium, Puposky	57	..	57	..	58	4	62	52	117	62	7	55	..	Yes	Yes	Yes	Yes	4	4
Oakland Park Sanatorium, Thief River Falls	55	..	55	..	33	1	34	55	88	20	8	55	..	Yes	Yes	Yes	Yes	8	..
Buena Vista Sanatorium, Wabasha	30	..	30	..	25	..	25	24	47	17	4	26	..	Yes	Yes	Yes	Yes	2	2
Fair Oaks Lodge Sanatorium, Wadena	34	..	34	..	8	..	8	17	32	16	3	16	..	Yes	Yes	Yes	....	4	..
Southwestern Minnesota Sanatorium, Worthington	51	3	54	..	39	1	40	44	94	41	16	37	..	Yes	Yes	Yes	Yes	6	..
Private																			
Sarahurst, Minneapolis	19	..	19	..	..	..	10	..	10	..	..	..	..	....	....	....	....	..	..
Pokegama Sanatorium, Pokegama	34	..	34	..	31	3	34	22	59	43	6	18	..	Yes	Yes	Yes	Yes	10	..
Totals	1,960	78	2,038	60	1,443	81	1,534	1,783	3,323	1,337	305	1,755	17	13	15	15	10	230	106
MISSISSIPPI																			
State																			
Mississippi State Tuberculosis Sanatorium, Sanatorium✚	400	50	450	50	307	1	308	254	533	254	43	273	391	Yes	Yes	Yes	Yes	57	..
County																			
Jones County Cottage Sanatorium, Ellisville	20	..	20	..	..	..	17	..	17	..	3	10	..	No	No	No	....	1	..
Hinds County Tuberculosis Sanatorium, Raymond	28	..	28	..	..	..	25	..	25	..	20	20	..	No	No	No	....	..	3
Private																			
Kings Daughters Tuberculosis Hospital, Meridian	45	..	45	..	29	..	29	25	58	12	10	17	..	Yes	No	No	Yes	1	..
Totals	493	50	543	50	336	1	379	279	633	266	76	320	391	2	1	1	2	59	3
MISSOURI																			
State																			
Missouri State Sanatorium, Mt. Vernon	677	14	691	..	846	45	891	626	1,380	542	125	681	177	Yes	Yes	Yes	Yes	21	84
County																			
Jaspar County Tuberculosis Hospital, Webb City	115	..	115	..	166	..	166	115	280	121	54	115	..	Yes	Yes	Yes	....	3	7
City																			
Kansas City Tuberculosis Hospital, Kansas City	260	..	260	..	493	3	496	192	698	218	76	194	..	Yes	Yes	Yes	Yes	34	123
Robert Koch Hospital, St. Louis✚	507	40	547	..	265	13	278	518	758	149	80	527	..	Yes	Yes	Yes	....	33	78
Private																			
Jewish Sanatorium, Robertson	54	32	86	32	16	35	51	40	82	51	6	31	..	Yes	Yes	Yes	Yes	1	10
Mt. St. Rose Sanatorium, St. Louis✚	135	..	135	..	206	..	206	125	329	161	45	123	15	Yes	Yes	Yes	....	20	10
Totals	1,748	86	1,834	32	1,992	96	2,088	1,616	3,527	1,242	386	1,671	192	6	6	6	3	112	312
MONTANA																			
State																			
Montana State Tuberculosis Sanitarium, Deer Lodge	198	10	208	..	197	11	208	203	409	161	35	210	55	Yes	Yes	Yes	No	24	9
NEBRASKA																			
State																			
Hospital for the Tuberculous, Kearney	128	33	161	..	151	24	175	154	305	127	27	148	25	Yes	Yes	Yes	....	18	..
NEW HAMPSHIRE																			
State																			
New Hampshire State Sanatorium, Glencliff	140	..	140	..	74	..	74	107	170	58	4	103	10	Yes	Yes	Yes	Yes	12	4
Private																			
Pembroke Sanatorium, Pembroke	81	25	106	..	83	20	103	83	192	85	28	89	12	Yes	Yes	Yes	Yes	8	2
Totals	221	25	246	..	157	20	177	190	362	143	32	192	22	2	2	2	2	20	6
NEW JERSEY																			
State																			
New Jersey State Sanatorium, Glen Gardner✚	384	110	494	..	346	83	429	416	882	325	20	475	5	Yes	Yes	Yes	Yes	30	34
County																			
Allenwood Sanatorium and Monmouth County Hospital for Tuberculosis, Allenwood	100	..	100	..	99	7	106	98	197	62	42	..	..	Yes	Yes	Yes	....	10	1
Lakeland Sanatorium, Grenloch	165	75	240	75	182	76	258	220	475	215	37	208	1	Yes	Yes	Yes	....	26	4
Hudson County Tuberculosis Hospital, Jersey City✚	500	..	500	..	599	..	599	374	946	346	184	416	..	Yes	Yes	Yes	Yes	65	80
Roosevelt Hospital, Metuchen	217	4	221	..	290	7	297	213	501	202	64	214	..	Yes	Yes	Yes	Yes	31	2
Shonghum Mountain Sanatorium, Morristown	52	..	52	..	42	..	42	52	93	35	7	52	8	Yes	Yes	Yes	Yes	2	7
Fairview Sanatorium, New Lisbon	120	..	120	..	99	..	99	106	200	69	34	106	..	Yes	Yes	Yes	....	12	1
Atlantic County Hospital for Tuberculous Diseases, Northfield	50	..	50	..	53	2	55	49	102	27	27	50	14	Yes	Yes	Yes	Yes	5	3
Valley View Sanatorium, Paterson	231	..	231	..	255	..	255	223	471	186	64	228	8	Yes	Yes	Yes	Yes	30	..

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TUBERCULOSIS SANATORIUMS—Continued

	Bed Capacity				Admissions													
NEW JERSEY—Continued	Adults	Children	Total	Preventorium Beds[1]	Adults	Children	Total	Daily Average	Patients Treated	Patients Discharged[2]	Deaths	Present Census	Waiting List	Laboratory	X-Ray	Pneumothorax	Tuberculosis Clinics	Nurses	Attendants
Bonnie Burn Sanatorium, Scotch Plains	256	151	407	114	267	156	423	355	738	322	90	326	20	Yes	Yes	Yes	Yes	..	..
Hudson County Tuberculosis Sanatorium, Secaucus	210	..	210	..	191	..	191	207	398	135	52	207	..	Yes	Yes	Yes	Yes	21	..
Essex Mountain Sanatorium, Verona✚	446	..	446	..	503	..	503	418	901	254	222	425	42	Yes	Yes	Yes	Yes	43	33
Private																			
Brown Mills Nursing Cottage, Brown Mills	58	..	58	..	38	..	38	30	38	28	11	..	..	No	Yes	Yes	....	5	1
Deborah Sanatorium, Brown Mills	56	..	56	..	61	..	61	43	105	46	2	44	110	Yes	Yes	Yes	Yes	4	..
Manor Nursing Cottage, Brown Mills	39	..	39	..	18	..	18	40	52	10	4	36	..	No	No	Yes	....	3	1
Sycamore Hall Sanatorium, Brown Mills	33	..	33	..	23	..	23	25	47	3	11	23	..	....	....	Yes	....	2	..
Idylease Sanatorium, Newfoundland	50	..	50	..	33	..	33	27	62	27	5	23	..	Yes	Yes	Yes	....	3	1
Totals	2,967	340	3,307	189	3,099	331	3,430	2,896	6,208	2,292	876	2,833	208	14	15	17	10	315	192
NEW MEXICO																			
Federal																			
Albuquerque Indian Sanatorium, Albuquerque	80	20	100	..	66	28	94	80	189	96	12	80	..	Yes	Yes	Yes	Yes	11	17
Jicarillo Indian Sanatorium, Dulce	..	56	56	..	..	53	53	42	106	14	..	43	..	Yes	Yes	Yes	Yes	6	2
U. S. Marine Hospital, Ft. Stanton	244	..	244	..	167	..	167	173	345	56	14	208	..	Yes	Yes	Yes	Yes	10	14
State																			
State Tuberculosis Sanatorium, Socorro	65	..	65	..	65	..	65	58	122	104	31	65	15	Yes	Yes	Yes	....	4	5
Private																			
Ahepa Silver District Sanatorium, Albuquerque	46	..	46	..	78	..	78	42	115	22	1	46	7	Yes	Yes	Yes	Yes	4	..
Methodist Sanatorium, Albuquerque	65	..	65	..	75	..	75	46	120	67	10	43	..	No	No	Yes	....	6	..
Valmora Sanatorium, Valmora	70	5	75	..	106	1	107	42	149	62	5	44	..	Yes	Yes	Yes	....	3	4
Totals	570	81	651	..	557	82	639	492	1,146	421	73	529	22	6	6	7	4	44	42
NEW YORK																			
Federal																			
Veterans Administration Facility, Castlepoint	479	..	479	..	673	..	673	463	1,146	522	144	461	18	Yes	Yes	Yes	....	51	58
Veterans Administration Facility, Sunmount	520	..	520	..	507	..	507	392	849	337	74	426	..	Yes	Yes	Yes	Yes	46	61
State																			
Hermann M. Biggs Memorial Hospital, Ithaca✚	200	50	250	..	209	23	232	171	370	87	24	186	..	Yes	Yes	Yes	Yes	47	76
Mount Morris Tuberculosis Hospital, Mt. Morris✚	200	50	250	..	196	5	201	188	352	230	24	206	..	Yes	Yes	Yes	Yes	33	..
Homer Folks Tuberculosis Hospital, Oneonta✚	200	50	250	..	238	25	263	231	495	187	38	224	..	Yes	Yes	Yes	Yes	52	16
New York State Hospital, Ray Brook	300	..	300	..	364	..	364	281	640	350	5	281	40	Yes	Yes	Yes	Yes	20	..
County																			
Montgomery Sanatorium, Amsterdam	60	12	72	12	138	22	160	67	233	67	15	73	..	Yes	Yes	Yes	....	6	2
Newton Memorial Hospital, Cassadega	120	60	180	..	93	28	121	173	290	100	15	173	16	Yes	Yes	Yes	Yes	17	..
Broome County Tuberculosis Hospital, Chenango Bridge	78	42	120	42	67	14	81	90	165	65	12	87	1	Yes	Yes	Yes	Yes	11	4
Delaware County Tuberculosis Sanatorium, Delhi	28	4	32	2	31	11	42	22	62	34	4	24	..	No	Yes	Yes	Yes	3	1
Chemung County Sanatorium, Elmira	44	..	44	..	53	..	53	39	85	34	10	41	2	No	Yes	Yes	Yes	4	..
Nassau County Sanatorium, Farmingdale	314	102	416	102	243	163	406	355	881	364	100	317	..	Yes	Yes	Yes	Yes	45	5
Westmount Sanatorium, Glens Falls	40	8	48	8	29	2	31	50	70	29	3	48	..	Yes	Yes	Yes	Yes	3	3
Oak Mount Sanatorium, Holcomb [3]	39	6	45	..	22	3	25	21	49	23	6	20	..	No	Yes	Yes	Yes	4	..
Suffolk Sanatorium, Holtsville	98	64	162	..	67	53	120	150	272	92	26	154	..	Yes	Yes	Yes	Yes	18	..
Ulster County Tuberculosis Hospital, Kingston	56	..	56	..	80	..	80	52	128	57	15	56	2	Yes	Yes	Yes	Yes	6	7
Niagara Sanatorium, Lockport	120	80	200	..	96	54	150	186	330	111	40	179	4	Yes	Yes	Yes	Yes	30	4
Saratoga County Tuberculosis Hospital, Middlegrove	60	..	60	..	66	3	69	52	116	50	15	50	2	Yes	Yes	Yes	Yes	8	2
Otsego County Sanatorium, Mt. Vision	26	..	26	..	29	1	30	18	48	25	2	21	9	No	Yes	Yes	Yes	4	..
Estelle and Walter C. Odell Memorial Sanatorium for Tuberculosis, Newburgh	50	..	50	..	36	..	36	49	85	19	13	51	4	Yes	Yes	Yes	Yes	6	..
Rocky Crest Sanatorium, Olean	40	..	40	..	57	2	59	34	87	38	11	38	1	No	Yes	Yes	Yes	4	2
Columbia Sanatorium, Philmont	48	28	76	28	54	5	59	54	106	30	15	54	..	Yes	Yes	Yes	Yes	9	..
Summit Park Sanatorium, Pomona	88	..	88	..	82	..	82	77	154	58	16	78	..	Yes	Yes	Yes	Yes	11	..
Oswego County Sanatorium, Richland	75	30	105	..	55	33	88	94	179	71	18	91	1	Yes	Yes	Yes	Yes	10	5
Iola-Monroe County Tuberculosis Sanatorium, Rochester✚	270	130	400	64	340	74	414	387	830	276	86	335	14	Yes	Yes	Yes	Yes	55	2
Pine Crest Sanatorium, Salisbury Center	62	28	90	..	42	20	62	88	154	56	18	80	7	Yes	Yes	Yes	Yes	11	..
Schenectady County Tuberculosis Hospital, Schenectady	122	4	126	..	94	13	107	126	234	83	25	123	5	Yes	Yes	Yes	Yes	23	11
Chenango County Tuberculosis Hospital, Sherburne	33	..	33	..	23	1	24	28	55	25	5	25	..	No	Yes	Yes	Yes	3	1
Onondaga Sanatorium, Syracuse	205	50	255	..	156	26	182	243	417	133	44	246	5	Yes	Yes	Yes	Yes	..	..
Oneida County Tuberculosis Sanatorium, Utica	134	54	188	..	125	41	166	173	330	93	28	170	..	Yes	Yes	Yes	Yes	23	7
Jefferson County Sanatorium, Watertown✚	58	20	78	..	74	37	111	66	181	110	7	64	..	Yes	Yes	Yes	Yes	9	3
Pawling Sanatorium, Wynantskill	118	34	152	..	119	19	138	142	270	108	26	137	..	Yes	Yes	Yes	Yes	15	..
City [4]																			
Municipal Sanatorium, Otisville✚	393	..	393	..	707	..	707	374	1,052	687	1	364	..	Yes	Yes	Yes	....	37	12
J. N. Adams Memorial Hospital, Perrysburg	424	58	482	..	303	66	369	435	810	320	42	448	..	Yes	Yes	Yes	....	25	25
Neponsit Beach Hospital for Children, Rockaway Beach	..	120	120	..	..	91	91	100	186	50	2	124	..	No	Yes	....	....	11	30
Sea View Hospital, Staten Island✚	1,244	202	1,446	..	1,611	179	1,790	1,662	3,361	1,053	501	1,678	108	Yes	Yes	Yes	....	423	39
Gray Oaks Hospital, Yonkers	55	..	55	..	55	..	55	50	103	51	26	53	..	No	Yes	Yes	Yes	6	1
City-County																			
Samuel W. Bowne Memorial Hospital, Poughkeepsie	79	50	129	50	73	46	119	125	245	111	14	125	..	Yes	Yes	Yes	Yes	5	3
Private																			
Montefiore Hospital Country Sanatorium, Bedford Hills✚	230	..	230	..	267	..	267	228	498	266	5	227	19	Yes	Yes	Yes	....	26	22
Brooklyn Thoracic Hospital, Brooklyn	114	9	123	..	132	12	144	118	256	110	28	120	15	Yes	Yes	Yes	Yes	9	3
Sanatorium Gabriels, Gabriels	128	..	128	..	60	..	60	50	103	40	5	57	..	Yes	Yes	Yes	Yes	12	2
Stony Wold Sanatorium, Lake Kushaqua	129	16	145	..	112	1	113	127	239	112	5	122	..	Yes	Yes	Yes	Yes	22	2
Workmen's Circle Sanatorium, Liberty	111	..	111	..	94	..	94	47	147	107	5	34	..	Yes	Yes	Yes	Yes	1	4
Potts Memorial Hospital, Livingston	55	..	55	..	38	..	38	55	93	38	..	55	8	Yes	Yes	Yes	Yes	3	..
Nazareth Hospital for Women and Children, New York City	170	80	250	..	302	81	383	246	620	314	65	248	20	No	No	Yes	....	18	10
St. Joseph's Hospital for Consumptives, New York City	270	..	270	..	398	..	398	288	695	279	141	275	..	Yes	Yes	Yes	....	36	26
Seton Hospital, New York City	255	..	255	..	296	..	296	254	546	206	85	254	..	Yes	Yes	Yes	....	17	..
St. John's Hospital, Ogdensburg	45	..	45	..	35	..	35	31	68	30	5	33	..	No	Yes	Yes	Yes	3	6
Sunnyside Health Farm, Otisville	10	..	10	..	..	..	9	..	9	..	..	..	..	....	....	....	....	..	..
Samuel and Nettie Bowne Hospital, Poughkeepsie	51	..	51	..	108	..	108	31	140	122	11	26	..	Yes	Yes	Yes	....	9	..

1. Included in beds for children. 2. Does not include deaths. 3. Closed May 1939. 4. Triboro Hospital, Jamaica, now under construction, 500 beds. ✚ Approved for Residencies in Tuberculosis.

TUBERCULOSIS SANATORIUMS—Continued

	Bed Capacity				Admissions													
NEW YORK—Continued	Adults	Children	Total	Preventorium Beds[1]	Adults	Children	Total	Daily Average	Patients Treated	Patients Discharged[2]	Deaths	Present Census	Waiting List	Laboratory	X-Ray	Pneumothorax	Tuberculosis Clinics	Nurses	Attendants
Franklin Manor, Saranac Lake	15	..	15	..	15	..	15	10	26	4	..	12	..	No	No	Yes	....	..	..
Northwoods Sanatorium, Saranac Lake	26	..	26	..	18	..	18	26	44	14	4	26	8	Yes	Yes	Yes	....	3	..
Reception Hospital, Saranac Lake	20	..	20	..	30	..	30	20	48	29	..	20	..	No	No	Yes	....	3	..
St. Marys of the Lake, Saranac Lake	24	..	24	..	22	..	22	17	40	21	4	15	..	No	No	Yes	....	..	..
Will Rogers Memorial Hospital, Saranac Lake	75	..	75	..	58	..	58	64	113	35	10	69	..	Yes	Yes	Yes	....	8	..
Trudeau Sanatorium, Trudeau✚	200	..	200	..	222	1	223	195	422	224	5	173	14	Yes	Yes	Yes	....	25	..
St. Anthony's Hospital, Woodhaven	400	..	400	..	600	..	600	377	974	374	226	374	..	Yes	Yes	Yes	....	32	27
House of Rest at Sprain Ridge, Yonkers	74	24	98	24	109	37	146	86	213	118	12	83	12	No	Yes	Yes	....	9	1
Totals	8,882	1,465	10,347	332	10,123	1,192	11,324	9,587	20,721	8,579	2,086	9,534	335	43	53	55	38	1,330	483
NORTH CAROLINA																			
Federal																			
Veterans Administration Facility, Oteen	850	..	850	..	..	..	1,760	782	2,537	1,483	253	808	35	Yes	Yes	Yes	Yes	88	128
State																			
Western North Carolina Sanatorium, Black Mountain	130	..	130	..	247	..	247	176	373	87	8	129	95	Yes	Yes	Yes	Yes	10	8
North Carolina Sanatorium for the Treatment of Tuberculosis, Sanatorium	480	70	550	..	680	49	729	492	1,203	608	59	527	241	Yes	Yes	Yes	Yes	60	4
County[3]																			
Halifax County Tuberculosis Sanitarium, Halifax	28	..	28	..	47	..	47	..	66	35	8	..	..	....	....	No	....	..	..
Scott Parker Sanatorium, Henderson	14	..	14	..	10	2	12	12	24	8	1	12	3	No	Yes	Yes	....	1	1
Mecklenburg Sanatorium, Huntersville	130	40	170	40	131	21	152	152	301	121	28	155	16	Yes	Yes	Yes	Yes	16	7
Guilford County Sanatorium, Jamestown	130	..	130	..	146	..	146	122	270	119	32	117	6	Yes	Yes	Yes	Yes	9	5
Wilkes County Tuberculosis Hut, North Wilksboro	14	..	14	..	13	..	13	6	18	5	2	8	..	No	No	Yes	....	2	..
Edgecombe County Tuberculosis Sanatorium, Tarboro	32	1	33	..	39	..	39	31	65	14	17	32	13	No	Yes	Yes	Yes	1	3
Forsyth County Sanatorium, Winston-Salem	134	..	134	..	91	..	91	128	212	89	20	120	41	Yes	Yes	Yes	Yes	13	4
City-County																			
Wake County Tuberculosis Sanatorium, Raleigh	23	..	23	..	52	1	53	22	70	16	14	26	..	No	Yes	Yes	Yes	3	4
Private																			
Ambler Heights Sanitarium, Asheville	22	..	22	..	25	..	25	15	37	17	1	19	..	No	Yes	Yes	....	3	..
St. Joseph's Hospital, Asheville	85	..	85	..	148	2	150	55	227	63	19	68	..	No	Yes	Yes	....	11	..
Sunset Heights, Asheville	16	..	16	..	..	..	31	12	31	..	..	..	..	No	No	....	....	3	..
Violet Hill Sanatorium, Asheville	37	..	37	..	64	..	64	26	64	38	4	..	..	No	No	Yes	....	2	2
Zephyr Hill Sanatorium, Asheville	30	..	30	..	25	..	25	20	47	22	2	22	..	No	No	Yes	....	2	..
Hillcroft Sanatorium, Biltmore	40	..	40	..	48	..	48	16	66	32	1	20	..	No	No	Yes	....	..	2
Fellowship Sanatorium of the Royal League, Black Mountain	20	..	20	..	17	..	17	..	17	5	2	..	..	Yes	Yes	Yes	....	..	..
Pine-Crest Manor Sanatorium, Southern Pines	43	..	43	..	59	..	59	25	82	50	4	20	..	Yes	Yes	Yes	....	4	..
Wilmington Tuberculosis Sanatorium, Wilmington	40	..	40	..	..	..	25	12	58	23	10	34	6	Yes	Yes	Yes	....	..	..
Totals	2,298	111	2,409	40	1,842	75	3,733	2,104	5,768	2,844	485	2,117	456	9	14	18	8	228	168
NORTH DAKOTA																			
State																			
North Dakota State Tuberculosis Sanatorium, San Haven✚	358	10	368	..	273	20	293	313	619	269	40	305	..	Yes	Yes	Yes	Yes	22	22
OHIO																			
State																			
Ohio State Sanatorium, Mt. Vernon	257	..	257	..	273	132	405	211	616	423	..	236	10	Yes	Yes	Yes	....	10	2
County																			
Edwin Shaw Sanatorium, Akron	120	84	204	..	159	80	239	200	435	231	18	188	15	Yes	Yes	Yes	Yes	21	12
Pleasant View Sanatorium, Amherst	79	12	91	..	67	12	79	89	156	53	16	90	8	Yes	Yes	Yes	Yes	8	10
Molly Stark Sanatorium, Canton	128	38	166	..	169	41	210	138	365	230	37	135	..	Yes	Yes	Yes	Yes	10	18
Mt. Logan Sanatarium, Chillicothe	64	..	64	..	50	2	52	62	111	35	14	69	..	Yes	Yes	Yes	Yes	5	..
Hamilton County Tuberculosis Sanatorium, Cincinnati✚	500	140	640	100	486	87	573	623	1,198	392	185	607	60	Yes	Yes	Yes	Yes	36	90
Franklin County Sanatorium, Columbus✚	170	30	200	..	150	14	164	191	348	112	50	188	93	Yes	Yes	Yes	Yes	13	16
Stillwater Sanatorium, Dayton	69	25	94	..	43	18	61	94	156	47	15	83	40	Yes	Yes	Yes	....	8	8
District Tuberculosis Hospital, Lima	115	10	125	..	101	4	105	90	196	60	25	91	..	Yes	Yes	Yes	Yes	17	9
Licking County Tuberculosis Sanatorium, Newark	57	..	57	..	120	..	120	47	172	63	13	45	..	Yes	Yes	Yes	Yes	5	4
Tuscarawas County Sanatorium, New Philadelphia	35	..	35	..	..	..	27	..	27	..	..	..	..	Yes	Yes	....	....	..	..
Belmont Sanatorium, St. Clairsville	56	..	56	..	49	4	53	50	102	42	10	51	..	Yes	Yes	Yes	Yes	5	5
Clark County Tuberculosis Sanatorium, Springfield	96	24	120	..	98	42	140	105	236	123	18	95	..	Yes	Yes	Yes	Yes	7	9
William Roche Memorial Tuberculosis Hospital, Toledo	160	16	176	..	217	13	230	158	341	105	73	163	30	Yes	Yes	Yes	Yes	8	30
Trumbull County Tuberculosis Sanatorium, Warren	50	..	50	..	76	..	76	47	126	61	12	48	6	Yes	Yes	Yes	Yes	7	3
Mahoning Tuberculosis Sanatorium, Youngstown	162	5	167	..	..	..	104	160	271	69	41	159	..	Yes	Yes	Yes	....	20	..
City																			
Sunny Acres, Cleveland Tuberculosis Sanatorium, Warrensville✚	370	64	434	..	380	58	438	432	863	411	19	434	75	Yes	Yes	Yes	....	52	17
Private																			
Oak Ridge Sanatorium, Green Springs	70	5	75	..	80	2	82	55	135	55	17	55	..	Yes	Yes	Yes	Yes	6	10
Rocky Glen Sanatorium, McConnelsville	140	3	143	..	170	..	170	137	310	119	33	139	4	Yes	Yes	Yes	Yes	16	..
Euclid-Mentor Sanatorium, Mentor	35	..	35	..	..	..	26	..	26	..	1	..	..	Yes	Yes	....	....	..	..
Avalon Sanatorium, Mount Vernon	50	..	50	..	..	..	87	43	140	39	21	70	6	Yes	Yes	Yes	....	..	..
Mount Royal Sanatorium (Brecksville P.O.), North Royalton	110	..	110	..	127	..	127	109	237	118	7	110	..	Yes	Yes	Yes	Yes	15	3
Totals	2,893	456	3,349	100	2,815	509	3,568	3,041	6,567	2,788	625	3,047	347	22	22	20	15	269	246
OKLAHOMA																			
Federal																			
Shawnee Indian Sanatorium, Shawnee	140	10	150	..	118	11	129	113	241	111	15	107	40	Yes	Yes	Yes	Yes	10	17
Choctaw-Chickasaw Sanatorium and Hospital, Talihina	75	..	75	..	98	73	171	64	244	115	5	62	..	Yes	Yes	Yes	Yes	5	10
State																			
Western Oklahoma Tuberculosis Sanatorium, Clinton	312	..	312	..	422	..	422	269	685	306	90	286	51	Yes	Yes	Yes	Yes	2	27
Eastern Oklahoma State Tuberculosis Sanatorium, Talihina	300	70	370	70	544	122	666	337	980	644	51	338	80	Yes	Yes	Yes	Yes	4	..

1. Included in beds for children. 2. Does not include deaths. 3. Cumberland County Tuberculosis Sanatorium, Fayetteville; opened Nov. 1, 1939; 20 beds; R. R. Gay Nash County Tuberculosis Sanatorium, Nashville; opened Sept. 15, 1939; 30 beds. ✚Approved for Residencies in Tuberculosis.

TUBERCULOSIS SANATORIUMS—Continued

	Bed Capacity				Admissions													
	Adults	Children	Total	Preventorium Beds[1]	Adults	Children	Total	Daily Average	Patients Treated	Patients Discharged[2]	Deaths	Present Census	Waiting List	Laboratory	X-Ray	Pneumothorax	Tuberculosis Clinics	Nurses	Attendants
OKLAHOMA—Continued																			
Private																			
Farm Sanatorium, Oklahoma City	25	..	25	..	111	..	111	14	124	96	13	10	..	No	No	Yes	....	4	..
Totals	852	80	932	70	1,293	206	1,499	797	2,274	1,272	174	803	171	4	4	5	4	25	65
OREGON																			
State																			
Oregon State Tuberculosis Hospital, Salem	289	36	325	36	181	33	214	327	540	200	35	328	36	Yes	Yes	Yes	Yes	23	9
Eastern Oregon State Tuberculosis Hospital, The Dalles	200	..	200	..	133	3	136	153	287	88	25	174	11	Yes	Yes	Yes	Yes	23	16
County																			
Multnomah County Tuberculosis Pavilion, Troutdale	41	..	41	..	82	..	82	33	123	73	17	30	..	No	No	Yes	....	5	..
Private																			
Portland Open Air Sanatorium, Milwaukee	40	..	40	..	123	3	126	28	165	95	13	30	..	Yes	Yes	Yes	....	6	3
Totals	570	36	606	36	519	39	558	541	1,115	456	90	562	47	3	3	4	2	57	28
PENNSYLVANIA																			
State																			
Hamburg State Sanatorium for Tuberculosis, Hamburg	540	..	540	..	508	..	508	516	1,040	382	136	518	249	Yes	Yes	Yes	....	32	62
Pennsylvania State Tuberculosis Sanatorium No. 1, South Mountain	788	216	1,004	216	486	317	803	989	1,747	767	48	933	322	Yes	Yes	Yes	Yes	30	15
Pennsylvania State Tuberculosis Sanatorium No. 2, State	570	270	840	..	343	290	633	803	1,408	493	95	820	..	Yes	Yes	Yes	Yes	60	22
County																			
Erie County Tuberculosis Hospital, Erie	66	..	66	..	98	..	98	62	98	28	9	61	4	Yes	Yes	Yes	Yes	8	9
Beaver County Sanatorium, Monaca	62	..	62	..	76	..	76	62	138	63	15	62	6	Yes	Yes	Yes	....	5	6
Berks County Tuberculosis Sanatorium, Reading	84	50	134	..	134	..	134	131	267	98	43	135	10	Yes	Yes	Yes	....	14	..
Lackawanna County Tuberculosis Hospital, Scranton	120	30	150	30	88	24	112	148	260	59	46	148	10	Yes	No	Yes	....	8	10
City																			
Leech Farm Sanatorium, Pittsburgh	255	45	300	..	361	50	411	280	685	266	131	287	24	No	Yes	Yes	....	23	..
City-County																			
Rossmere Sanatorium, Lancaster	55	2	57	..	101	..	101	52	154	77	24	55	4	No	Yes	Yes	....	6	..
Private																			
DeVitt's Camp, Allenwood	108	..	108	..	220	..	220	90	322	214	8	105	3	Yes	Yes	Yes	Yes	15	..
Eagleville Sanatorium for Consumptives, Eagleville✚	188	..	188	..	172	5	177	176	341	158	14	169	59	Yes	Yes	Yes	Yes	25	9
Grand View Institution, Oil City	50	..	50	..	57	1	58	19	81	55	2	22	..	Yes	Yes	Yes	Yes	5	..
Home for Consumptives, Philadelphia	79	25	104	..	87	28	115	91	196	79	29	89	..	Yes	Yes	Yes	....	8	12
Rush Hospital for Consumption and Allied Diseases, Philadelphia	89	55	144	34	428	..	428	110	534	311	45	117	35	No	Yes	Yes	....	21	2
Tuberculosis League Hospital, Pittsburgh	150	..	150	..	206	6	212	140	348	180	24	144	60	Yes	Yes	Yes	Yes	6	18
White Haven Sanatorium, White Haven✚	250	..	250	..	308	1	309	203	503	232	80	190	..	Yes	Yes	Yes	....	31	15
Totals	3,454	693	4,147	280	3,673	722	4,483	3,852	8,210	3,462	749	3,855	786	13	15	16	7	297	180
RHODE ISLAND																			
State																			
State Sanatorium, Wallum Lake✚	548	82	630	..	348	16	364	466	779	190	87	502	..	Yes	Yes	Yes	Yes	41	55
Private																			
St. Joseph's Sanatorium, Hillsgrove	75	..	75	..	16	..	16	35	52	9	10	33	..	No	No	....	....	4	2
Totals	623	82	705	..	364	16	380	501	831	199	97	535	..	1	1	1	1	45	57
SOUTH CAROLINA																			
State																			
South Carolina Sanatorium, State Park	394	46	440	..	..	30	551	426	928	351	149	413	..	Yes	Yes	Yes	....	29	55
County																			
Florence-Darlington Tuberculosis Sanatorium, Florence	71	..	71	..	104	..	104	66	165	60	26	69	12	Yes	Yes	Yes	Yes	6	6
Greenville County Tuberculosis Sanatorium, Greenville	65	16	81	12	90	26	116	77	191	122	14	76	3	Yes	Yes	Yes	....	11	4
Pinehaven Sanatorium, Navy Yard	60	..	60	..	118	7	125	60	183	76	101	65	6	Yes	Yes	Yes	....	8	..
City-County																			
Camp Alice, Sumter County Tuberculosis Sanitarium, Sumter	26	..	26	..	47	..	47	22	63	4	4	19	..	No	No	No	....	..	..
Private																			
Ridgewood Tuberculosis Camp, Columbia	70	..	70	..	75	..	75	44	121	45	19	35	13	No	No	Yes	Yes	5	..
Totals	686	62	748	12	434	63	1,018	695	1,651	658	313	677	34	4	4	5	2	59	65
SOUTH DAKOTA																			
Federal																			
Sioux Sanatorium, Rapid City	112	..	112	..	..	..	119	101	205	22	..	101	40	Yes	Yes	Yes	Yes	24	14
State																			
South Dakota State Sanatorium for Tuberculosis, Sanator	192	..	192	..	134	4	138	148	369	136	22	167	..	Yes	Yes	Yes	....	15	5
Totals	304	..	304	..	134	4	257	249	574	158	22	268	40	2	2	2	1	39	19
TENNESSEE																			
County																			
Davidson County Tuberculosis Hospital, Nashville✚	250	50	300	..	210	65	275	232	511	219	53	234	32	Yes	Yes	Yes	Yes	26	18
City-County																			
Beverly Hills Sanatorium, Knoxville	135	25	160	..	120	21	141	116	265	89	44	121	..	Yes	Yes	Yes	Yes	18	20
Oakville Memorial Sanatorium, Oakville	260	90	350	..	230	66	296	345	621	..	64	332	..	Yes	Yes	Yes	Yes	26	..
Private																			
Pine Breeze Sanatorium, Chattanooga✚	175	100	275	..	160	53	213	241	443	134	60	247	20	Yes	Yes	Yes	Yes	15	17
International Printing Pressmen and Assistant's Union Sanatorium, Pressmen's Home	60	..	60	..	..	..	14	..	14	..	..	..	..	Yes	Yes	Yes	....	..	..
Watauga Sanitarium, Ridgetop	40	..	40	..	40	..	40	16	64	45	2	17	..	No	Yes	Yes	....	2	..
Totals	920	265	1,185	..	760	205	979	950	1,918	487	223	951	52	5	6	6	4	87	55

1. Included in beds for children. 2. Does not include deaths. ✚ Approved for Residencies in Tuberculosis.

TUBERCULOSIS SANATORIUMS--Continued

	Bed Capacity				Admissions														
	Adults	Children	Total	Preventorium Beds[1]	Adults	Children	Total	Daily Average	Patients Treated	Patients Discharged[2]	Deaths	Present Census	Waiting List	Laboratory	X-Ray	Pneumothorax	Tuberculosis Clinics	Nurses	Attendants
TEXAS																			
State																			
Kerrville State Sanatorium, Kerrville	162	10	172	..	296	15	311	116	410	242	47	168	20	Yes	Yes	Yes	....	9	..
State Tuberculosis Sanatorium, Sanatorium	703	162	865	162	2,026	358	2,384	827	3,232	2,348	28	854	249	Yes	Yes	Yes	....	80	..
County[4]																			
Jefferson County Tuberculosis Hospital, Beaumont	61	24	85	24	110	33	143	84	217	105	19	91	2	Yes	Yes	Yes	....	8	9
Jefferson County Tuberculosis Hospital, Unit 2, Beaumont	22	..	22	..	37	2	39	21	61	18	12	21	17	Yes	Yes	Yes	....	1	2
Bexar County Tuberculosis Colony, Southton	75	..	75	..	..	..	152	59	231	79	60	81	..	No	No	No	....	4	2
City-County																			
Woodlawn Hospital, Dallas	118	..	118	..	186	4	190	98	290	132	71	96	7	Yes	Yes	Yes	Yes	16	..
Elmwood Sanatorium, Fort Worth	66	..	66	..	27	..	27	54	91	18	11	56	21	No	Yes	Yes	Yes	5	4
Houston Tuberculosis Hospital, Houston	122	50	172	50	291	153	444	160	597	335	54	158	..	Yes	No	Yes	....	7	9
Private[6]																			
Hendricks-Laws Sanatorium, El Paso	70	..	70	..	48	..	48	12	68	33	4	11	..	No	Yes	Yes	....	2	..
Long Sanatorium, El Paso	50	..	50	..	54	2	56	17	74	37	11	25	..	Yes	Yes	Yes	....	2	..
Price Sanatorium, El Paso	20	..	20	..	..	..	20	16	20	Closed April 15, 1939									
St. Joseph's Sanatorium, El Paso	75	..	75	..	99	1	100	29	136	90	8	26	..	Yes	....	Yes	....	..	..
Mountain View Sanatorium, Kerrville	35	..	35	..	39	..	39	16	58	..	2	15	..	No	No	Yes	....	1	4
Sunnyside Sanatorium, Kerrville	20	..	20	..	57	..	57	20	77	33	6	18	2	Yes	Yes	Yes	....	2	2
Dr. Farmer's Sanatorium, San Antonio	20	..	20	..	15	..	15	7	24	8	..	11	..	Yes	Yes	Yes	....	1	2
Grace Lutheran Sanatorium for Tuberculosis, San Antonio	35	..	35	..	97	..	97	27	120	71	..	26	..	Yes	Yes	Yes	....	1	12
Woodmen of the World War Memorial Hospital, San Antonio✚	150	..	150	..	179	..	179	116	309	179	20	93	25	Yes	Yes	Yes	....	9	8
Von Ormy Cottage Sanatorium, Von Ormy[3]	27	..	27	..	26	..	26	17	45	25	4	13	..	No	No	Yes	....	3	1
Totals	1,831	246	2,077	236	3,587	568	4,327	1,696	6,060	3,753	335	1,763	343	12	12	16	2	151	55
UTAH																			
State																			
Utah State Tuberculosis Sanatorium, Ogden	96	..	96		Established 1939														
VERMONT																			
State																			
Washington County Sanatorium, Barre	47	..	47	..	59	..	59	40	93	23	25	45	..	Yes	Yes	Yes	Yes	3	6
Vermont Sanatorium, Pittsford	80	..	80	..	102	4	106	70	179	120	19	59	10	Yes	Yes	Yes	Yes	5	2
Totals	127	..	127	..	161	4	165	110	272	143	44	104	10	2	2	2	2	8	8
VIRGINIA																			
State																			
Piedmont Sanatorium, Burkeville	150	..	150	..	232	..	232	142	370	177	55	149	148	Yes	Yes	Yes	Yes	22	3
Catawba Sanatorium, Catawba Sanatorium	340	..	340	..	..	..	460	331	794	397	61	334	..	Yes	Yes	Yes	....	35	11
Blue Ridge Sanatorium, Charlottesville	230	40	270	40	325	59	384	263	652	354	30	267	50	Yes	Yes	Yes	....	36	8
City[5]																			
Pine Camp Hospital, Brook Hill	222	64	286	..	177	30	207	209	401	118	69	200	..	Yes	Yes	Yes	Yes	28	..
Charles R. Grandy Sanatorium, Norfolk	100	..	100	..	103	..	103	87	193	52	56	90	..	No	Yes	Yes	....	8	..
Hilltop Sanatorium, Danville	40	20	60	20	75	50	125	35	200	40	7	72	..	No	Yes	Yes	Yes	2	..
Tidewater Memorial Hospital, Lynnhaven	50	..	50	..	101	..	101	50	151	95	41	50	19	Yes	Yes	Yes	Yes	6	4
Mount Regis Sanatorium, Salem	20	..	20	..	48	..	48	12	58	39	1	19	3	Yes	Yes	Yes	Yes	4	..
Totals	1,152	124	1,276	60	1,061	139	1,660	1,129	2,819	1,272	320	1,181	220	6	8	8	5	141	26
WASHINGTON																			
Federal																			
Yakima Sanatorium, Toppenish	37	..	37	..	47	..	79	32	110	8	8	32	..	Yes	Yes	Yes	....	4	3
County																			
Oakhurst Sanatorium, Elma	51	14	65	14	62	29	91	65	150	87	10	63	7	Yes	Yes	Yes	Yes	7	..
Mountain View Sanatorium, Lakeview	110	30	140	..	110	32	142	128	284	193	..	118	3	No	Yes	Yes	Yes	12	2
King County Tuberculosis Hospital, Seattle✚	160	..	160	..	141	..	141	141	300	90	54	155	..	Yes	Yes	Yes	Yes	25	..
Alderecrest Sanatorium, Snohomish	57	..	57	..	52	1	53	53	107	44	13	55	5	Yes	Yes	Yes	Yes	8	..
Edgecliff Sanatorium, Spokane	125	22	147	..	85	9	94	117	217	83	25	109	..	Yes	Yes	Yes	....	..	..
Blue Mountain Sanatorium, Walla Walla	30	6	36	..	38	8	46	32	77	45	3	31	..	Yes	Yes	Yes	Yes	4	3
Private																			
Laurel Beach Sanatorium, Seattle	80	5	85	..	174	4	178	77	258	153	23	82	..	Yes	Yes	Yes	Yes	10	13
Riverton Sanatorium, Seattle	50	..	50	..	48	2	50	48	102	45	18	47	..	Yes	Yes	Yes	....	10	1
Totals	700	77	777	14	757	85	874	693	1,614	748	154	692	15	8	9	9	6	80	22
WEST VIRGINIA																			
State																			
Pinecrest Sanitarium, Beckley	148	..	148	..	148	..	148	145	295	93	14	141	217	Yes	Yes	Yes	....	23	..
Denmar Sanatorium, Denmar	86	14	100	..	102	13	115	97	165	33	..	89	..	No	Yes	Yes	....	7	1
Hopemont Sanitarium, Hopemont✚	440	35	475	..	295	19	314	476	760	223	60	473	100	Yes	Yes	Yes	Yes	56	46
County																			
Grandview Sanatorium, Moundsville	30	..	30	..	32	2	34	23	59	24	6	24	..	No	No	....	....	4	1
Ohio County Tuberculosis Sanatorium, Wheeling	38	..	38	..	21	..	21	38	59	13	9	38	..	Yes	Yes	Yes	....	4	3
Private																			
Hill Crest Sanatorium, Charleston	..	41	41	30	..	44	44	37	75	32	..	41	6	No	No	Yes	....	..	5
Eastmont Tuberculosis Sanatorium, Morgantown	30	..	30	..	..	..	56	24	56	..	4	..	..	....	....	....	....	..	..
Totals	772	90	862	30	598	78	676	840	1,411	318	93	806	323	3	4	5	1	87	55
WISCONSIN																			
State																			
Lake Tomahawk State Camp, Lake Tomahawk	42	..	42	..	46	..	46	41	88	40	..	43	..	No	No	No	Yes	..	..
Wisconsin State Sanatorium, Statesan✚	240	..	240	..	122	..	122	205	322	93	15	214	15	Yes	Yes	Yes	....	13	18
County																			
Mt. Washington Sanatorium, Eau Claire	91	..	91	..	94	7	101	84	157	51	17	89	3	Yes	Yes	Yes	....	15	25
Middle River Sanatorium, Hawthorne	138	..	138	..	89	..	89	130	212	52	14	135	2	Yes	Yes	Yes	Yes	21	..
Pinehurst Sanatorium, Janesville	64	4	68	..	82	4	86	66	147	79	13	68	2	Yes	Yes	Yes	Yes	7	5
Forest Lawn Sanatorium, Jefferson	52	..	52	..	46	..	46	50	100	57	12	53	..	Yes	Yes	Yes	Yes	7	..

1. Included in beds for children. 2. Does not include deaths. 3. Closed May 1, 1939. 4. Austin-Travis County Sanatorium, Austin; opened Feb. 1, 1940; 48 beds. 5. Roanoke City Tubercular Sanatorium, Roanoke; opened Jan. 1, 1940; 69 beds. 6. Carman Sanatorium, Dallas; 20 beds.
✚ Approved for Residencies in Tuberculosis.

TUBERCULOSIS SANATORIUMS—Continued

	Bed Capacity				Admissions													
	Adults	Children	Total	Preventorium Beds[1]	Adults	Children	Total	Daily Average	Patients Treated	Patients Discharged[2]	Deaths	Present Census	Waiting List	Laboratory	X-Ray	Pneumothorax	Tuberculosis Clinics	Nurses	Attendants
WISCONSIN—Continued																			
County																			
Riverview Sanatorium, Kaukauna	56	9	65	..	116	7	125	58	183	64	17	57	2	Yes	Yes	Yes	Yes	10	..
Willowbrook Sanatorium, Kenosha	66	6	72	6	45	6	51	46	87	31	10	49	2	Yes	Yes	Yes	....	6	2
Lake View Sanatorium, Madison	128	12	140	..	98	..	98	136	232	71	19	136	6	Yes	Yes	Yes	Yes	17	5
Oak Forest Sanatorium, Onalaska	66	..	66	..	55	..	55	64	121	26	13	67	5	Yes	Yes	Yes	....	12	..
Oak Sanatorium, Pewaukee	42	..	42	..	55	..	55	40	96	55	5	35	3	Yes	Yes	Yes	Yes	5	..
Rocky Knoll Sanatorium, Plymouth	75	15	90	..	47	9	56	92	149	46	9	94	1	Yes	Yes	Yes	Yes	9	1
Purealr Sanatorium, Purealr	70	..	70	..	72	2	74	68	142	75	14	68	..	Yes	Yes	Yes	Yes	5	6
Sunny Rest Sanatorium, Racine	58	..	58	..	92	4	96	57	151	31	7	58	3	Yes	Yes	Yes	Yes	5	4
Mount View Sanatorium, Wausau	66	..	66	..	73	5	78	64	142	77	11	68	2	Yes	Yes	Yes	....	12	4
Muirdale Sanatorium, Wauwatosa+	447	53	500	..	596	122	718	452	1,146	483	150	465	..	Yes	Yes	Yes	Yes	53	54
Hickory Grove Sanatorium, West DePere	98	8	106	..	..	..	106	98	106	..	12	96	5	Yes	Yes	Yes	....	9	1
Maplecrest Sanatorium, Whitelaw	50	..	50	..	109	..	109	48	159	61	8	48	2	Yes	Yes	Yes	Yes	8	1
Sunny View Sanatorium, Winnebago	79	17	96	17	70	30	100	92	193	90	9	95	7	Yes	Yes	Yes	....	8	1
Private																			
Morningside Sanatorium, Madison	20	30	50	30	23	10	33	46	81	37	5	33	..	Yes	Yes	Yes	....	7	1
River Pines Sanatorium, Stevens Point	62	..	62	..	73	..	73	60	126	54	11	66	..	Yes	Yes	Yes	....	5	3
Totals	2,010	154	2,164	53	2,003	206	2,317	1,997	4,140	1,573	371	2,037	60	20	20	20	12	234	131
WYOMING																			
State																			
Wyoming Tuberculosis Sanatorium, Basin	33	..	33	..	58	..	58	26	81	59	8	26	..	Yes	Yes	Yes	Yes	4	..

TUBERCULOSIS-ISOLATION HOSPITALS

State	Control	Total Capacity	TB Beds				Admissions												
			Adults	Children	Total	Preventorium Beds[1]	Adults	Children	Total	Daily Average	Patients Treated	Patients Discharged[2]	Deaths	Present Census	Waiting List	Laboratory	X-Ray	Pneumothorax	Tuberculosis Clinics
CONNECTICUT																			
Englewood Hospital, Bridgeport	City	150	42	..	42	..	86	4	90	23	109	89	19	23	..	No	No	Yes	...
Municipal Hospital, Greenwich	City	73	16	..	16	..	16	..	16	4	17	9	2	5	..	Yes	No	Yes	...
MASSACHUSETTS																			
Board of Health Hospital, Brookline	City	55	30	..	30	..	46	..	46	27	62	22	6	23	..	Yes	Yes	Yes	Yes
Lowell Tuberculosis Hospital, Lowell	City	94	60	..	60	..	61	2	63	..	112	37	30	..	..	....	Yes	Yes	...
Malden Contagious Hospital, Malden	City	50	14	..	14	..	..	..	..	8	..	26	1	4	..	No	No	No	...
Barnstable County Sanatorium, Pocasset	County	48	30	..	30	..	..	..	43	52	89	..	43	46	..	Yes	Yes	Yes	Yes
Somerville Contagious Disease Hospital, Somerville	City	40	3	20	23	20	8	..	8	1	10	5	1	..	..	No	No	No	...
Health Department Hospitals, Springfield	City	100	56	..	56	..	83	..	83	48	126	54	19	53	3	Yes	Yes	Yes	Yes
Belmont Hospital, Worcester+	City	250	113	12	125	12	151	17	168	94	280	143	43	96	..	Yes	Yes	Yes	Yes
MICHIGAN																			
Herman Kiefer Hospital, Detroit+	City	1,335	810	..	810	..	1,441	17	1,458	796	2,242	1,134	311	797	..	Yes	Yes	Yes	...
Fairmount Hospital, Kalamazoo	County	140	70	5	75	..	56	4	60	50	114	53	13	48	..	Yes	Yes	Yes	Yes
Saginaw County Hospital, Saginaw	County	175	110	10	120	..	112	7	119	104	216	69	31	117	..	Yes	Yes	Yes	Yes
MISSOURI																			
City Isolation Hospital, St. Louis+	City	225	60	..	60	..	149	5	154	51	203	..	19	54	250	Yes	Yes	Yes	...
MONTANA																			
Detention Hospital, Great Falls	CyCo	25	8	..	8	..	3	..	3	..	3	3	..	..	..	No	No	...	...
NEW JERSEY																			
Essex County Hospital for Contagious Diseases, Belleville	County	540	...	30	30	..	...	22	22	16	41	17	7	17	..	Yes	Yes	Yes	...
Paterson City Hospital, Paterson	City	115	40	..	40	..	53	..	53	20	69	27	10	22	..	No	No	Yes	...
"Bergen Pines" Bergen County Hospital, Ridgewood	County	500	294	60	354	60	228	37	265	278	534	169	75	290	1	Yes	Yes	Yes	Yes
Trenton Municipal Hospital, Trenton	City	375	101	..	101	..	...	..	174	70	251	82	59	77	..	Yes	Yes	Yes	...
NEW YORK																			
Kingston Avenue Hospital, Brooklyn+	City	510	72	..	72	..	162	..	162	70	229	144	10	71	..	Yes	Yes	Yes	Yes
Riverside Hospital, New York City	City	332	284	..	284	..	557	..	557	343	906	316	222	347	..	Yes	Yes	Yes	...
Willard Parker Hospital, New York City	City	424	128	..	128	..	291	..	291	120	423	260	37	126	..	Yes	Yes	Yes	...
Niagara Falls Municipal Hospital, Niagara Falls	City	38	..	..	..	..	..	..	4	..	4	3	1	..	..	No	...	...	...
Schenectady City Hospital, Schenectady	City	35	..	..	..	..	13	2	15	..	15	12	3	2	..	Yes	Yes	Yes	...
PENNSYLVANIA																			
Philadelphia Hospital for Contagious Diseases, Philadelphia	City	1,000	..	25	25	..	..	7	7	9	16	5	5	6	..	Yes	Yes	No	...
RHODE ISLAND																			
Charles V. Chapin Hospital, Providence	City	265	60	..	60	..	128	3	131	45	178	74	31	45	..	Yes	Yes	Yes	Yes
WASHINGTON																			
Firland Sanatorium and Isolation Hospital, Richmond Highlands	City	250	200	50	250	50	120	..	120	219	343	120	20	212	..	Yes	Yes	Yes	Yes
Totals		7,144	2,601	212	2,813	142	3,764	127	4,112	2,448	6,592	2,873	1,018	2,481	254	19	19	21	10

1. Included in beds for children. 2. Does not include deaths. + Approved for Residencies in Tuberculosis.

TUBERCULOSIS DEPARTMENTS OF GENERAL HOSPITALS

(TWENTY-FIVE BEDS AND OVER)

	Total Capacity	TB Beds: Adults	TB Beds: Children	TB Beds: Total	Preventorium Beds[1]	Admissions: Adults	Admissions: Children	Admissions: Total	Daily Average	Patients Treated	Patients Discharged[2]	Deaths	Present Census	Waiting List	Laboratory	X-Ray	Pneumothorax	Tuberculosis Clinics
ALABAMA																		
Federal																		
Veterans Admin. Facility, Tuscaloosa	346	27	...	27	..	67	...	67	24	87	50	13	24	..	Yes	Yes	Yes	Yes
ARIZONA																		
Federal																		
Southern Navajo General Hospital and Sanatorium, Fort Defiance	226	90	10	100	..	100	...	100	...	107	66	...	8	..	Yes	Yes	Yes	Yes
Veterans Admin. Facility, Tucson	358	252	...	252	..	327	...	327	250	566	278	60	228	3	Yes	Yes	Yes	Yes
Veterans Admin. Facility, Whipple	553	144	...	144	..	223	...	223	113	337	215	27	99	..	Yes	Yes	Yes	Yes
County																		
Pima County General Hospital, Tucson	128	40	...	40	..	38	1	39	37	76	39	8	39	..	Yes	Yes	Yes	Yes
Private																		
St. Mary's Hospital and Sanatorium, Tucson	135	30	...	30	..	213	2	215	...	215	187	28	...	..	Yes	Yes	Yes	...
ARKANSAS																		
County																		
Pulaski County Hospital, Little Rock	200	28	...	28	..	54	...	54	28	82	25	29	28	50	Yes	No	Yes	...
CALIFORNIA																		
Federal																		
Fort Bidwell Hospital, Fort Bidwell[3]	38	30	...	30	..	17	12	29	...	29	8	1	...	..	Yes	Yes	Yes	Yes
U. S. Naval Hospital, Mare Island	500	49	...	49	..	45	...	45	17	63	43	3	17	..	Yes	Yes	Yes	Yes
U. S. Naval Hospital, San Diego	1,000	81	...	81	..	75	...	75	70	161	78	10	73	..	Yes	Yes	Yes	Yes
U. S. Marine Hospital, San Francisco	478	46	...	46	..	88	...	88	44	134	79	12	43	..	Yes	Yes	Yes	...
Veterans Admin. Facility, West Los Angeles	1,720	68	...	68	..	348	...	348	68	414	241	53	68	10	Yes	Yes	Yes	Yes
County																		
Riverside County Hospital, Arlington	350	82	25	107	..	93	15	108	87	202	25	35	79	..	Yes	Yes	Yes	Yes
San Joaquin General Hospital, French Camp	575	60	...	60	..	126	4	130	56	200	20	61	57	..	Yes	Yes	Yes	Yes
Fresno County General Hospital, Fresno	500	86	12	98	..	81	...	208	84	305	107	46	92	..	Yes	Yes	Yes	Yes
Los Angeles County Hospital, Los Angeles✚	3,154	300	...	300	..	...	...	...	...	...	1,027	277	...	..	Yes	Yes	Yes	Yes
Madera County Hospital, Madera	132	25	2	27	..	28	4	32	...	50	17	7	18	..	No	Yes	Yes	Yes
Merced General Hospital, Merced	250	50	...	50	..	...	...	...	...	84	11	...	...	..	Yes	Yes	Yes	Yes
Orange County Hospital, Orange	352	115	16	131	..	131	24	155	110	255	73	38	108	..	Yes	Yes	Yes	Yes
Sacramento County Hospital, Sacramento	475	45	...	45	..	198	9	207	47	207	129	64	50	..	Yes	Yes	Yes	Yes
Monterey County Hospital, Salinas	191	38	5	43	..	59	11	70	43	113	38	17	43	50	Yes	Yes	Yes	Yes
San Bernardino County Charity Hospital, San Bernardino	323	61	17	78	..	93	25	118	66	181	75	42	75	22	Yes	Yes	Yes	Yes
San Diego County General Hospital, San Diego✚	663	146	41	187	..	119	15	134	172	305	149	48	172	98	Yes	Yes	Yes	Yes
Fairmont Hospital of Alameda County, San Leandro✚	837	160	...	160	..	...	...	501	...	618	394	86	157	..	Yes	Yes	Yes	...
Community Hospital of San Mateo County, San Mateo	200	46	...	46	..	56	...	56	41	90	34	19	40	..	Yes	Yes	Yes	Yes
Marin County Hospital, San Rafael	169	22	6	28	..	...	...	10	19	10	9	1	17	..	No	No	...	...
Santa Barbara General Hospital, Santa Barbara	233	56	30	86	20	67	27	94	74	168	66	24	64	..	Yes	Yes	Yes	Yes
Sonoma County Hospital, Santa Rosa	319	94	...	94	..	...	...	79	...	79	...	...	...	..	Yes	Yes	...	...
Ventura County Hospital, Ventura	240	40	2	42	..	35	6	41	37	80	27	12	39	..	Yes	Yes	Yes	...
City-County																		
San Francisco Hospital, San Francisco✚	1,400	422	73	495	..	938	...	938	491	1,431	697	243	491	28	Yes	Yes	Yes	...
Private																		
Ross General Hospital, Ross	72	25	...	25	..	91	2	93	21	114	74	3	28	2	Yes	Yes	Yes	Yes
COLORADO																		
Federal																		
Fitzsimons General Hospital, Denver	1,185	500	...	500	..	1,442	...	1,442	...	1,835	1,493	63	...	..	Yes	Yes	Yes	...
City-County																		
Denver General Hospital, Denver✚	556	68	...	68	..	126	...	126	50	177	81	53	56	..	Yes	Yes	Yes	Yes
Private																		
Beth-El General Hospital and Sanatorium, Colorado Springs	202	60	...	60	..	66	2	68	47	107	48	6	54	..	Yes	Yes	Yes	Yes
Glockner Sanatorium and Hospital, Colorado Springs	150	80	...	80	..	70	2	72	43	112	46	17	43	..	Yes	Yes	Yes	...
St. Francis Hospital and Sanatorium, Colorado Springs	150	75	...	75	..	...	...	75	43	145	78	...	45	..	Yes	Yes	Yes	...
Union Printers Home and Tuberculosis Sanatorium, Colorado Springs	172	60	...	60	..	30	...	30	55	90	34	7	60	..	Yes	Yes	Yes	...
CONNECTICUT																		
City																		
Municipal Hospitals, Hartford	315	27	...	27	..	93	...	93	20	113	73	14	26	..	Yes	Yes	Yes	...
DISTRICT OF COLUMBIA																		
Federal																		
St. Elizabeths Hospital	450	110	...	110	..	27	...	27	96	139	19	15	92	..	Yes	Yes	...	...
Walter Reed General Hospital	1,042	20	6	26	..	136	4	140	8	158	123	14	13	..	Yes	Yes	Yes	Yes
City																		
Gallinger Municipal Hospital	1,119	191	...	191	..	685	4	689	159	772	383	196	193	..	Yes	Yes	...	...
FLORIDA																		
County																		
Duval County Hospital, Jacksonville	216	40	...	40	..	66	...	66	36	97	61	8	39	1	Yes	Yes	Yes	...
Dade County Hospital, Miami	175	54	2	56	..	70	2	72	22	72	46	12	17	3	Yes	Yes	Yes	Yes
City																		
James M. Jackson Memorial Hospital, Miami	460	54	...	54	..	136	...	136	43	178	111	56	41	..	Yes	Yes	Yes	Yes
GEORGIA																		
Federal																		
Veterans Admin. Facility, Atlanta	265	25	...	25	..	93	...	93	7	104	84	6	4	3	Yes	Yes	Yes	Yes

1. Included in beds for children. 2. Does not include deaths. 3. Closed Dec. 15, 1939. ✚ Approved for Residencies in Tuberculosis.

TUBERCULOSIS DEPARTMENTS OF GENERAL HOSPITALS—Continued
(TWENTY-FIVE BEDS AND OVER)

	Total Capacity	TB Beds: Adults	TB Beds: Children	TB Beds: Total	Preventorium Beds[1]	Admissions: Adults	Admissions: Children	Admissions: Total	Daily Average	Patients Treated	Patients Discharged[2]	Deaths	Present Census	Waiting List	Laboratory	X-Ray	Pneumothorax	Tuberculosis Clinics
IDAHO																		
Private																		
St. Alphonsus Hospital, Boise	135	25	...	25	..	28	2	30	23	54	28	5	21	..	Yes	Yes	Yes	...
ILLINOIS																		
Federal																		
Veterans Admin. Facility, Hines	1,760	263	...	263	..	...	...	...	255	250	...	...	252	..	Yes	Yes	Yes	...
County																		
Cook County Hospital, Chicago	3,300	340	...	340	..	1,373	...	1,373	333	1,099	596	696	326	..	Yes	Yes	Yes	...
Lake County General Hospital, Waukegan	90	25	...	25	..	57	2	59	24	77	39	14	24	6	Yes	Yes	Yes	Yes
INDIANA																		
City																		
Indianapolis City Hospital, Indianapolis	672	100	...	100	..	102	...	102	68	203	65	63	75	..	Yes	Yes	Yes	Yes
KANSAS																		
Federal																		
Veterans Admin. Facility, Wadsworth	734	63	...	63	..	133	...	133	58	184	80	14	60	..	Yes	Yes	Yes	...
State																		
University of Kansas Hospitals, Kansas City	300	40	5	45	..	33	...	33	30	62	21	7	34	..	Yes	Yes	Yes	Yes
LOUISIANA																		
Federal																		
Veterans Admin. Facility, Alexandria	599	109	...	109	..	315	...	315	77	386	234	44	81	..	Yes	Yes	Yes	...
U. S. Marine Hospital, New Orleans	572	48	...	48	..	104	...	104	36	143	77	18	40	..	Yes	Yes	Yes	...
State																		
Charity Hospital, New Orleans	1,735	323	...	323	..	1,374	147	1,521	283	1,834	279	245	324	..	Yes	Yes	Yes	Yes
MAINE																		
Private																		
Central Maine General Hospital, Lewiston	193	32	...	32	..	58	...	58	32	90	55	10	32	..	Yes	Yes	Yes	Yes
MARYLAND																		
Federal																		
U. S. Marine Hospital, Baltimore	440	46	...	46	..	65	...	65	42	107	72	25	38	..	Yes	Yes	Yes	Yes
City																		
Baltimore City Hospitals, Baltimore✦	1,285	280	...	280	..	...	...	...	188	178	...	...	240	..	Yes	Yes	Yes	...
MASSACHUSETTS																		
Federal																		
Veterans Admin. Facility, Rutland Heights	467	273	...	273	..	...	...	...	...	...	...	...	...	..	Yes	Yes	Yes	...
State																		
State Infirmary, Tewksbury	3,150	280	...	280	..	171	...	171	...	333	180	61	153	..	Yes	Yes	Yes	...
City																		
Fall River General Hospital, Fall River	216	93	7	100	..	103	8	111	92	207	63	40	92	2	Yes	Yes	Yes	Yes
Private																		
Burbank Hospital, Fitchburg	203	34	...	34	..	38	...	38	21	57	25	7	25	..	Yes	Yes	Yes	Yes
MICHIGAN																		
Federal[3]																		
U. S. Marine Hospital, Detroit	291	50	...	50	..	123	...	123	44	163	63	18	42	..	Yes	Yes	Yes	Yes
State																		
University Hospital, Ann Arbor✦	1,285	98	...	98	..	552	...	552	...	643	335	28	97	20	Yes	Yes	Yes	Yes
County																		
Eloise Hospital, Eloise	1,437	92	...	92	..	56	...	56	90	148	43	15	90	..	Yes	Yes	Yes	...
Grand View Hospital, Ironwood	62	50	...	50	..	39	1	40	42	82	51	21	31	..	Yes	Yes	Yes	Yes
Private																		
Henry Ford Hospital, Detroit	572	33	28	61	..	70	60	130	62	173	118	24	47	..	Yes	Yes	Yes	Yes
Lincoln Hospital, Detroit	90	50	...	50	..	139	...	139	...	164	53	59	33	..	Yes	Yes	Yes	...
Shurly Hospital, Detroit	85	25	...	25	..	50	...	50	25	81	...	21	21	..	Yes	Yes	Yes	...
MINNESOTA																		
Federal																		
Veterans Admin. Facility, Minneapolis	642	186	...	186	.	270	...	270	171	435	310	51	163	..	Yes	Yes	Yes	Yes
City-County																		
Ancker Hospital, St. Paul	850	220	10	230	..	222	14	236	183	425	164	60	194	..	Yes	Yes	Yes	Yes
Private																		
St. Luke's Hospital, Duluth	237	26	...	26	..	76	...	76	24	102	77	7	26	8	Yes	Yes	Yes	Yes
St. Mary's Hospital, Duluth	260	48	...	48	..	...	...	103	36	132	138	14	51	..	Yes	Yes	Yes	...
MISSOURI																		
Federal																		
Veterans Admin. Facility, Excelsior Springs	252	31	...	31	..	71	...	71	21	91	55	13	13	..	Yes	Yes	Yes	...
City																		
Homer G. Phillips Hospital for Colored, St. Louis✦	684	60	4	64	..	197	8	225	60	278	126	106	64	59	Yes	Yes	Yes	...
St. Louis City Hospital, St. Louis	750	70	...	70	..	...	...	....	46	50	...	124	45	..	Yes	Yes	Yes	Yes
NEBRASKA																		
Federal																		
Veterans Admin. Facility, Lincoln	201	25	...	25	..	24	...	24	22	48	24	5	23	..	Yes	Yes	Yes	Yes
County																		
Douglas County Hospital, Omaha	412	81	...	81	..	55	...	55	71	132	45	29	59	30	Yes	Yes	Yes	Yes
NEW JERSEY																		
City																		
Jersey City Hospital, Jersey City	1,200	60	4	64	..	219	8	227	64	294	181	39	67	..	Yes	Yes	Yes	...
Newark City Hospital, Newark	700	33	...	33	..	327	...	327	23	343	158	74	22	..	Yes	Yes	Yes	...
Private																		
St. Mary Hospital, Hoboken	400	40	...	40	..	138	...	138	34	160	76	36	32	..	Yes	Yes	...	...
Christ Hospital, Jersey City	206	25	...	25	..	41	...	41	25	66	66	41	...	..	Yes	Yes	Yes	...
St. Francis' Hospital, Jersey City	228	26	...	26	..	85	...	85	25	109	32	29	24	..	Yes	Yes	...	...
NEW MEXICO																		
Federal																		
Veterans Admin. Facility, Albuquerque	259	105	...	105	..	170	...	170	91	267	139	26	102	..	Yes	Yes	Yes	Yes
Veterans Admin. Facility, Fort Bayard	305	143	...	143	..	257	...	257	99	339	148	28	93	..	Yes	Yes	Yes	Yes
Private																		
St. Joseph Sanatorium and Hospital, Albuquerque	170	50	...	50	..	...	...	...	45	45	...	...	34	..	Yes	Yes	Yes	...
Southwestern Presbyterian Sanatorium, Albuquerque	144	87	...	87	..	111	...	111	43	159	119	14	40	..	Yes	Yes	Yes	...

1. Included in beds for children. 2. Does not include deaths. 3. Veterans Administration Facility, Dearborn. Total beds 351; beds for tuberculosis 55; opened April 15, 1939. ✦ Approved for Residencies in Tuberculosis.

TUBERCULOSIS DEPARTMENTS OF GENERAL HOSPITALS—Continued
(TWENTY-FIVE BEDS AND OVER)

	Total Capacity	TB Beds: Adults	TB Beds: Children	TB Beds: Total	TB Beds: Preventorium Beds[1]	Admissions: Adults	Admissions: Children	Admissions: Total	Daily Average	Patients Treated	Patients Discharged[2]	Deaths	Present Census	Waiting List	Laboratory	X-Ray	Pneumothorax	Tuberculosis Clinics
NEW YORK																		
Federal																		
U. S. Marine Hospital, New York City	452	117	...	117	..	142	...	142	111	253	86	25	112	..	Yes	Yes	Yes	...
Veterans Admin. Facility, New York City	973	61	...	61	..	255	...	255	51	307	167	66	45	..	Yes	Yes	Yes	Yes
County																		
Grasslands Hospital, Valhalla✦	780	252	92	344	16	226	160	386	324	696	328	57	311	..	Yes	Yes	Yes	Yes
City																		
Kings County Hospital, Brooklyn✦	2,825	200	...	200	..	501	...	501	202	710	416	90	204	110	Yes	Yes	Yes	Yes
Queens General Hospital, Jamaica	644	32	...	32	..	218	...	218	36	242	184	...	31	..	Yes	Yes	Yes	Yes
Bellevue Hospital, New York City✦	2,431	284	...	284	..	2,522	...	2,522	337	2,742	...	328	340	..	Yes	Yes	Yes	...
Harlem Hospital, New York City	543	28	...	28	..	623	39	662	...	683	539	115	29	29	Yes	Yes	Yes	Yes
Metropolitan Hospital, New York City✦	1,367	270	37	307	..	538	82	620	405	1,020	435	188	382	38	Yes	Yes	Yes	Yes
New York City Hospital, New York City	1,000	52	...	52	..	258	...	258	44	294	266	76	45	..	Yes	Yes	Yes	Yes
Riker's Island Hospital, New York City	260	52	...	52	..	114	...	114	18	124	95	4	21	..	Yes	Yes	Yes	...
City-County																		
Edward J. Meyer Memorial Hospital, Buffalo✦	1,025	256	52	308	..	403	14	417	245	655	249	167	247	..	Yes	Yes	Yes	Yes
Private																		
Albany Hospital, Albany✦	593	123	...	123	..	249	9	258	124	384	221	40	123	11	Yes	Yes	Yes	Yes
Metropolitan Life Insurance Company Sanatorium, Mt. McGregor	350	225	...	225	..	...	...	40	...	165	42	2	...	..	Yes	Yes	Yes	...
Lenox Hill Hospital, New York City✦	541	39	...	39	..	183	...	183	37	224	175	10	37	10	Yes	Yes	Yes	Yes
Montefiore Hospital for Chronic Diseases, New York City✦	714	164	...	164	..	263	...	263	167	432	186	79	167	73	Yes	Yes	Yes	Yes
OHIO																		
Federal																		
U. S. Marine Hospital, Cleveland	251	25	...	25	..	25	...	25	...	25	...	...	...	..	Yes	Yes	...	Yes
City																		
City Hospital, Cleveland✦	1,521	350	...	350	..	879	7	886	...	1,233	745	196	348	..	Yes	Yes	Yes	Yes
Private																		
Evangelical Deaconess Hospital, Cleveland	144	32	...	32	..	...	...	...	30	31	13	29	32	..	Yes	Yes	...	...
St. Alexis Hospital, Cleveland	220	33	...	33	..	...	...	57	33	90	32	25	33	..	Yes	Yes	Yes	Yes
St. Vincent Charity Hospital, Cleveland	295	28	...	28	..	...	4	80	29	108	54	26	28	..	Yes	Yes	Yes	...
Woman's Hospital, Cleveland	93	25	...	25	..	38	...	38	24	63	38	20	25	..	Yes	Yes	Yes	Yes
OKLAHOMA																		
Federal																		
Kiowa Indian Hospital, Lawton	166	29	...	29	..	120	3	123	...	134	90	10	23	11	Yes	Yes	Yes	Yes
Veterans Admin. Facility, Muskogee	423	55	...	55	..	219	...	219	51	273	130	23	54	2	Yes	Yes	Yes	...
State																		
Soldiers Tubercular Sanatorium, Sulphur	133	56	28	84	28	110	51	161	62	183	140	20	84	..	Yes	Yes	Yes	Yes
PENNSYLVANIA																		
Federal																		
Veterans Admin. Facility, Aspinwall	505	101	...	101	..	210	...	210	131	335	244	72	97	..	Yes	Yes	Yes	Yes
City																		
Philadelphia General Hospital, Philadelphia	2,676	472	...	472	..	1,387	...	1,387	348	1,696	774	507	311	..	Yes	Yes	Yes	...
Pittsburgh City Home and Hospitals, Mayview	988	60	...	60	..	81	...	81	53	122	24	40	59	..	Yes	Yes	Yes	...
Private																		
Germantown Dispensary and Hospital, Philadelphia✦	340	35	...	35	..	56	1	57	30	90	15	7	31	..	Yes	Yes	Yes	Yes
Jefferson Medical College Hospital, Philadelphia	688	40	...	40	..	83	...	83	31	120	83	5	32	6	Yes	Yes	Yes	Yes
SOUTH CAROLINA																		
County																		
Spartanburg General Hospital, Spartanburg	230	58	...	58	..	51	...	51	34	87	52	2	32	12	Yes	Yes	Yes	Yes
SOUTH DAKOTA																		
Federal																		
Veterans Admin. Facility, Hot Springs	281	32	...	32	..	27	...	27	20	45	16	7	19	..	Yes	Yes	Yes	Yes
TEXAS																		
Federal																		
William Beaumont General Hospital, El Paso	602	60	...	60	..	105	...	105	21	122	81	11	25	..	Yes	Yes	Yes	Yes
U. S. Marine Hospital, Galveston	206	29	...	29	..	54	...	54	...	54	43	7	18	..	Yes	Yes	Yes	Yes
Veterans Admin. Facility, Legion	402	275	...	275	..	418	...	418	250	672	326	61	221	40	Yes	Yes	Yes	Yes
City-County																		
El Paso City-County Hospital, El Paso	212	45	...	45	..	164	1	165	26	199	128	48	23	..	Yes	Yes	Yes	Yes
UTAH																		
County																		
Salt Lake County General Hospital, Salt Lake City	231	32	...	32	..	43	...	43	23	73	30	16	26	..	Yes	Yes	Yes	Yes
VIRGINIA																		
Federal																		
U. S. Marine Hospital, Norfolk	360	40	...	40	..	50	...	50	19	66	33	11	22	..	Yes	Yes	Yes	...
WASHINGTON																		
Federal																		
U. S. Marine Hospital, Seattle	400	60	...	60	..	61	...	61	56	113	40	16	57	..	Yes	Yes	Yes	Yes
Tacoma Hospital, Tacoma	268	..	218	218	..	17	217	234	186	435	262	8	165	24	Yes	Yes	Yes	Yes
Veterans Admin. Facility, Walla Walla	400	127	...	127	..	204	...	204	121	319	319	38	120	..	Yes	Yes	Yes	...
WISCONSIN																		
Federal																		
Veterans Admin. Facility, Milwaukee	1,178	204	...	204	..	445	...	445	169	572	339	63	170	6	Yes	Yes	Yes	Yes
State																		
State of Wisconsin General Hospital, Madison	650	25	...	25	..	180	2	182	24	201	159	11	24	13	Yes	Yes	Yes	Yes
Totals	78,508	12,693	732	13,425	61	25,578	1,011	27,677	9,405	37,978	18,895	6,391	10,192	767	127	127	120	79

1. Included in beds for children. 2. Does not include deaths. ✦ Approved for Residencies in Tuberculosis.

TUBERCULOSIS DEPARTMENTS OF GENERAL HOSPITALS

(BELOW TWENTY-FIVE BEDS)

	Total Capacity of Hospital	Tuberculosis Department		
		Beds	Patients Admitted	Patients Present
Federal — ALABAMA				
U. S. Marine Hospital, Mobile	191	12	28	6
Veterans Admin. Facility, Tuskegee	1,498	10	43	10
Private				
Atmore General Hospital, Atmore	25	..	2	..
Fraternal Hospital, Montgomery	45	4	6	..
John Albion Andrew Memorial Hospital Tuskegee Institute	80	5	..	..
Federal — ARIZONA				
Western Navajo Hospital, Tuba City	32	..	32	..
Truxton Canon Indian Hospital, Valentine	11	..	..	..
Ft. Yuma Indian Hospital, Yuma	29	4	2	1
County				
Cochise County Hospital, Douglas	45	9	29	9
Pinal County Hospital, Florence	50	8	..	..
Gila County Hospital, Globe	50	10	10	..
Yavapi County Hospital, Prescott	70	..	10	..
Private				
Booker T. Washington Memorial Hospital, Phoenix	30	17	54	..
Good Samaritan Hospital, Phoenix	158	..	96	..
St. Joseph's Hospital, Phoenix	188	..	105	..
Mercy Hospital, Prescott	30	..	9	..
Desert Sanatorium and Institute of Research, Tucson	89	16	16	1
City — ARKANSAS				
Little Rock City Hospital, Little Rock	176	..	..	..
Federal — CALIFORNIA				
Hoopa Valley Indian Hospital, Hoopa	38	8	19	3
Station Hospital, March Field	70	..	..	..
Soboba Indian Hospital, San Jacinto	34	12	14	8
U. S. Ship Relief, San Pedro	367	..	..	..
County				
Imperial County Farm and Hospital, El Central	115	20	32	..
San Benito County Hospital, Hollister	11	9	8	3
Stanislaus County Hospital, Modesto	230	15	28	23
Shasta County Hospital, Redding	77	12	10	4
Santa Cruz County Hospital, Santa Cruz	110	20	34	19
Private				
Banning Hospital and Sanatorium, Banning	25	15	13	11
Long Beach Community Hospital, Long Beach	100	..	7	..
Seaside Memorial Hospital, Long Beach	200	..	..	..
California Hospital, Los Angeles	261	..	35	..
St. Bernardine's Hospital, San Bernardino	125	..	5	..
Santa Barbara Cottage Hospital, Santa Barbara	165	..	22	1
State — COLORADO				
Colorado General Hospital, Denver	160	..	31	1
Private				
St. Joseph's Hospital, Denver	240	..	..	..
Mennonite Hospital and Sanitarium, La Junta	70	20	21	19
St. Mary Hospital, Pueblo	150	8	43	4
Mt. San Rafael Hospital, Trinidad	63	10	..	..
Private — CONNECTICUT				
Charlotte Hungerford Hospital, Torrington	130	..	12	..
Private — DELAWARE				
Kent General Hospital, Dover	50	..	..	..
Federal — DISTRICT OF COLUMBIA				
Freedman's Hospital, Washington	322	..	83	1
U. S. Naval Hospital, Washington	202	..	..	1
Veterans Admin. Facility, Washington	327	..	281	14
Private				
Garfield Memorial Hospital, Washington	316	11	..	..
Providence Hospital, Washington	260	..	..	..
Washington Sanitarium and Hospital, Washington	170	..	5	..
Federal — FLORIDA				
Veterans Admin. Facility, Bay Pines	195	4	..	..
U. S. Marine Hospital, Key West	65	10	7	2
State				
Florida Agricultural and Mechanical Hospital Tallahassee	43	3	14	..
City				
Brevard Hospital, Melbourne	30	2	7	..
Mercy Hospital, St. Petersburg	44	..	7	..
Mound Park Hospital, St. Petersburg	172	..	9	..
Private				
Orange General Hospital, Orlando	135	15	..	..
Panama City Hospital, Panama City	16	2	1	..
Centro Asturiano Hospital, Tampa	75	12	6	11
Federal — GEORGIA				
Station Hospital, Fort Benning	315	..	10	1
City				
University Hospital, Augusta	327	23	115	..
Private				
Coker's Hospital, Canton	35	..	4	4
Private — IDAHO				
Coeur D'Alene Hospital, Coeur D'Alene	30	20	20	12
Graham Hospital, Sandpoint	21	..	..	1
Federal — ILLINOIS				
U. S. Marine Hospital, Chicago	301	17	10	7
Private				
Amboy Public Hospital, Amboy	17	..	5	..
Berwyn Hospital, Berwyn	75	..	..	..
Evangelical Hospital, Chicago	175	..	15	..
Provident Hospital, Chicago	142	3	30	..
University of Chicago Clinics, Chicago†	520	13	..	8
Evanston Community Hospital, Evanston	27	1	5	..
ston	27	1	5	..
St. Elizabeth Hospital, Granite City	125	7	12	..
Our Saviour's Hospital, Jacksonville	81	..	5	..
St. Joseph's Hospital, Joliet	220	..	35	..
St. Francis Hospital, Kewanee	67	6	84	..
St. Anthony's Hospital, Rock Island	200	4	17	1
Federal — INDIANA				
U. S. Marine Hospital, Evansville	100	5	6	2
Private				
St. John Hospital, Gary	17	3	6	6
St. Joseph Hospital, Mishawaka	100	..	1	..
Ball Memorial Hospital, Muncie	217	..	..	..
St. Anthony's Hospital, Terre Haute	171	..	30	..
Federal — IOWA				
Veterans Admin. Facility, Des Moines	300	..	63	7
Private				
Mercy Hospital, Burlington	125	..	10	..
St. Francis Hospital, Burlington	50	..	..	..
St. Anthony Hospital, Carroll	108	..	6	..
Mercy Hospital, Cedar Rapids	147	..	..	..
St. Joseph Mercy Hospital, Centreville	53	3	9	..
St. Francis Hospital, Grinnell	40	7	4	1
St. Joseph Mercy Hospital, Waverly	50	..	6	..
Federal — KANSAS				
Station Hospital, Ft. Riley	201	..	5	..
Haskell Institute Hospital, Lawrence	40	..	..	..
Private				
Halstead Hospital, Halstead	150	..	21	..
Bethany Hospital, Kansas City	130	..	13	..
St. Margaret's Hospital, Kansas City	224	..	34	2
St. John's Hospital, Leavenworth	65	2	5	..
Grisell Memorial Hospital, Ransom	24	..	..	..
Federal — KENTUCKY				
Station Hospital, Ft. Knox	47	..	6	..
City				
Louisville City Hospital, Louisville	528	..	140	..
Private				
Red Bird Evangelical Hospital, Beverly	9	3	7	..
St. Elizabeth Hospital, Covington	386	12	31	10
Wm. Booth Memorial Hospital, Covington	94	7	19	7
T. J. Samson Community Hospital, Glasgow	51	..	54	..
Mayfield Hospital, Mayfield	40	2	27	..
Private — LOUISIANA				
Flint Goodridge Hospital, New Orleans	88	1	17	..
St. Landry Clinic, Opelousas	25	..	..	..
North Louisiana Sanitarium, Shreveport	100	1	24	..
Gilmer Chest Hospital, Shreveport	18	18	..	..
Federal — MAINE				
U. S. Marine Hospital, Portland	72	..	6	3
Veterans Admin. Facility, Togus	294	4	49	4
Private				
Rumford Community Hospital, Rumford	75	1	8	..
Federal — MARYLAND				
Station Hospital, Edgewood	56	..	2	2
Private				
Bon Secours Hospital, Baltimore	175	..	13	..
Franklin Square Hospital, Baltimore	175	..	13	..
Federal — MASSACHUSETTS				
U. S. Marine Hospital, Chelsea	170	12	26	15
Private				
Beth Israel Hospital, Boston	220	2	..	..
Truesdale Hospital, Fall River	134	..	..	..
Union Hospital, Fall River	172	..	15	..
Newton Hospital, Newton	252	..	19	..
Waltham Hospital, Waltham	215	..	7	..
City — MICHIGAN				
Hurley Hospital, Flint	417	10	..	..
Private				
St. Mary's Hospital, Detroit	320	..	..	..
West Fort Hospital, Detroit	36	19	22	..
Woman's Hospital, Detroit	225	..	4	..
St. Luke's Hospital, Marquette	125	..	27	..
Munising Hospital, Munising	24	1	..	..
Federal — MINNESOTA				
Fond du Lac Indian Hospital, Cloquet	21	..	3	..

† Approved for Residencies in Tuberculosis.

TUBERCULOSIS DEPARTMENTS OF GENERAL HOSPITALS—Continued
(BELOW TWENTY-FIVE BEDS)

State / City / Private / Federal / County	Total Capacity of Hospital	Tuberculosis Department: Beds	Tuberculosis Department: Patients Admitted	Tuberculosis Department: Patients Present
MINNESOTA—Continued				
University Hospitals, Minneapolis	450	10	52	8
City				
Minneapolis General Hospital, Minneapolis	616	10	124	10
Miller Memorial Hospital, Duluth	50	21	27	..
Private				
Asbury Hospital, Minneapolis	122	..	10	..
St. Mary's Hospital, Minneapolis	220	12	56	7
Swedish Hospital, Minneapolis	225	..	11	..
St. Joseph's Hospital, St. Paul	250	..	..	..
MISSISSIPPI				
Federal				
Choctaw-Mississippi Hospital, Philadelphia	35	..	4	..
Mississippi State Charity Hospital, Jackson	72	..	25	..
City				
Rosedale-Bolivar County Hospital, Rosedale	18	..	3	..
Private				
Biloxi Hospital, Biloxi	58	..	1	..
Northeast Mississippi Hospital, Booneville	40	8	18	..
Colored King's Daughter's Hospital, Greenville	50	..	4	..
King's Daughters Hospital, Gulfport	57	..	1	..
Houston Hospital, Houston	35	..	7	..
Jackson Infirmary, Jackson	67	..	4	..
Mississippi Baptist Hospital, Jackson	138	..	17	..
McComb City Hospital, McComb	27	..	1	..
Anderson Infirmary, Meridian	45	..	1	..
Philadelphia Hospital, Philadelphia	28	..	1	..
Martin Sanatorium, Picayune	24	..	1	..
Vicksburg Infirmary, Vicksburg	50	..	6	..
Vicksburg Sanatorium, Vicksburg	75	..	16	..
Winona Infirmary, Winona	30	..	4	..
MISSOURI				
Federal				
Station Hospital, Jefferson Barracks	143	..	5	..
U. S. Marine Hospital, St. Louis	120	10	7	11
City				
Kansas City General Hospital, Kansas City	460	6	..	..
Kansas City General Hospital, No.2, Kansas City	250	19	93	7
Private				
Independence Sanitarium and Hospital, Independence	67	..	8	..
De Paul Hospital, St. Louis	250	..	8	..
Jewish Hospital, St. Louis	250	..	21	..
Lutheran Hospital, St. Louis	150	..	8	..
St. John's Hospital, St. Louis	286	..	15	..
MONTANA				
Federal				
Blackfeet Hospital, Browning	45	6	41	2
Ft. Belknap Indian Hospital, Harlem	49	11	31	7
Tongue River Agency Hospital, Lame Deer	42	..	..	7
County				
Silver Bow County Hospital, Butte	129	15	45	17
Private				
St. James Hospital, Butte	175	4	29	..
Columbus Hospital, Great Falls	340	..	28	..
Good Samaritan Hospital, Jordan	20	2	..	..
St. Joseph's Hospital, Lewiston	133	5	7	..
NEBRASKA				
Federal				
Winnebago Indian Hospital, Winnebago	63	17	48	6
City				
Lincoln General Hospital, Lincoln	154	3	17	2
Private				
St. Joseph's Hospital, Alliance	80	..	..	6
St. Elizabeth Hospital, Lincoln	174	..	19	..
NEVADA				
Federal				
Walker River Indian Hospital, Schurz	34	..	11	..
Carson Agency Hospital, Stewart	36	..	27	6
County				
Lyon County Hospital, Yerington	16	4	..	..
Washoe General Hospital, Reno	190	10	..	..
NEW HAMPSHIRE				
Private				
Mary Hitchcock Memorial Hospital, Hanover	184	..	..	..
NEW JERSEY				
City				
Irvington General Hospital, Irvington	96	..	11	..
Private				
Atlantic City Hospital, Atlantic City	231	..	..	..
Bayonne Hospital and Dispensary, Bayonne	195	..	39	4
Dr. E. C. Hazard Hospital, Long Branch	95	9	10	3
Burlington County Hospital, Mt. Holly	123	..	12	2
St. Francis Hospital, Trenton	282	..	27	..
NEW MEXICO				
Federal				
Eastern Navajo Hospital, Crownpoint	40	..	155	..
Zuni Sanatorium, Black Rock	43	10	19	5
Private				
St. Joseph's Hospital, Clayton	25	3	3	..
San Juan Hospital, Farmington	20	4	..	..
St. Vincent Sanatorium and Hospital, Santa Fe	100	..	1	1
NEW YORK				
Federal				
U. S. Naval Hospital, Brooklyn	508	..	11	1
U. S. Marine Hospital, Buffalo	75	3	9	1
Station Hospital, Fishers Island	66	3	3	..
Station Hospital, Ft. Slocum	145	..	20	1
NEW YORK—Continued				
County				
Onondago County Hospital, Onondago	183	6	12	4
Oneida County Hospital, Rome	200	..	18	..
City				
Coney Island Hospital, Brooklyn	357	..	67	..
Gouverneur Hospital, New York	174	..	213	221
Morrisania City Hospital, New York	471	..	106	18
Private				
Long Island College Hospital, Brooklyn	420	..	76	..
St. John's Hospital, Brooklyn	204	7	23	8
Arnot Ogden Memorial Hospital, Elmira	183	..	23	..
Charles S. Wilson Memorial Hospital, Johnson City	318	15	29	4
New Rochelle Hospital, New Rochelle	121	..	11	..
Community Hospital, New York	85	..	8	1
Manhattan General Hospital, New York	226	17	77	1
New York Hospital, New York	911	19	136	19
New York Post-Graduate Medical School and Hospital, New York	410	2	..	..
University Heights Sanitarium, New York	67	2	..	..
Peekskill Hospital, Peekskill	77	14	13	13
General Hospital, Saranac Lake	34	14	304	3
Sailors' Snug Harbor Hospital, Staten Island	194	4	..	..
Syracuse Memorial Hospital, Syracuse	210	..	34	..
NORTH CAROLINA				
Federal				
Station Hospital, Ft. Bragg	115	..	5	..
State				
Central Prison Hospital, Raleigh	110	9	..	..
Private				
Duke Hospital, Durham	400	..	..	..
L. Richardson Memorial Hospital, Greensboro	60	3	..	..
Ellen Fitzgerald Hospital, Monroe	35	..	4	..
NORTH DAKOTA				
Federal				
Fort Berthold Indian Hospital, Elbowoods	25	2	8	1
Veterans Admin. Facility, Fargo	100	..	12	..
Ft. Totten Hospital, Ft. Totten	37	..	23	..
County				
Cass County Hospital, Fargo	30	8	6	..
Private				
Trinity Hospital, Jamestown	77	..	5	..
St. Joseph's Hospital, Minot	110	2	..	..
Mercy Hospital, Valley City	87	7	..	..
OHIO				
City				
Springfield City Hospital, Springfield	258	11	..	..
Private				
Bethesda Hospital, Cincinnati	239	..	18	..
Good Samaritan Hospital, Cincinnati	550	10	73	10
Fairview Park Hospital, Cleveland	109	8	4	8
Polyclinic Hospital, Cleveland	105	..	68	..
Good Samaritan Hospital, Dayton	250	22	123	20
Miami Valley Hospital, Dayton	385	..	105	19
St. Elizabeth Hospital, Dayton	400	20	42	19
Salem City Hospital, Salem	60	15	19	15
Mercy Hospital, Toledo	115	..	..	2
Toledo Hospital, Toledo	275	8	30	3
Youngstown Hospital, Youngstown	503	7	63	7
OKLAHOMA				
Federal				
Clinton Indian Hospital, Clinton	33	..	28	1
Cheyenne and Arapaho Hospital, Concho	46	14	13	..
Pawnee Ponca Hospital, Pawnee	50	16	60	4
Private				
St. Anthony Hospital, Oklahoma City	300	..	18	..
Great Western Hospital, Oklahoma City	35	15	47	6
Ponca City Hospital, Ponca City	50	3	12	..
OREGON				
Federal				
Klamath Indian Hospital, Klamath Agency	27	3	..	..
PENNSYLVANIA				
State				
Scranton State Hospital, Scranton	125	..	18	..
Private				
Fitzgerald Mercy Hospital, Darby	200	12	20	..
Easton Hospital, Easton	200	5	..	..
Frankford Hospital, Philadelphia	144	..	15	..
Frederick Douglas Memorial Hospital, Philadelphia	85	21	62	19
Hospital of the Protestant Episcopal Church, Philadelphia	530	6	44	9
Mercy Hospital, Philadelphia	100	4	57	2
Northern Liberties Hospital, Philadelphia	58	..	25	..
Temple University Hospital, Philadelphia	386	4	..	4
Mercy Hospital, Wilkes-Barre	195	3	..	..
SOUTH CAROLINA				
Federal				
Station Hospital, Moultrieville	90	6	23	..
Private				
Berkeley County Hospital, Monck Corners	52	22	19	13
SOUTH DAKOTA				
Federal				
Rosebud Agency Indian Hospital, Rosebud	64	..	41	3
Private				
Methodist State Hospital, Mitchell	100	..	..	60
Moe Hospital and Clinic, Sioux Falls	56	6	12	..
Sacred Heart Hospital, Yankton	195	..	14	1

TUBERCULOSIS DEPARTMENTS OF GENERAL HOSPITALS—Continued
(BELOW TWENTY-FIVE BEDS)

	Total Capacity of Hospital	Tuberculosis Department: Beds	Tuberculosis Department: Patients Admitted	Tuberculosis Department: Patients Present
TENNESSEE				
Federal				
U. S. Marine Hospital, Memphis	130	9	..	9
Veterans Admin. Facility, Memphis	450	..	74	2
Veterans Admin. Facility, Mountain Home	556	8	72	..
Private				
Clarksville Hospital, Clarksville	50	..	6	..
Fitts-White Clinic, Jackson	20	2	13	..
Methodist Hospital, Memphis	155	..	..	..
George W. Hubbard Hospital, Nashville	165	8	61	9
"Uplands" Cumberland Mountain Sanatorium, Pleasant Hill	44	24	37	14
Pulaski Hospital, Pulaski	23	..	1	..
TEXAS				
Federal				
Station Hospital, San Antonio	670	20	40	10
State				
Texas State Prison Hospital, Huntsville	108	10	..	..
Prairie View Hospital, Prairie View	50	4	3	2
County				
Northwest Texas Hospital, Amarillo	75	11	11	11
City				
John Sealy Hospital, Galveston	434	16	..	..
Private				
Methodist Hospital, Dallas	140	..	8	..
Fort Worth Negro Community Hospital, Ft. Worth	25	7	20	..
Lillie and Duke Hospital, Goose Creek	21	..	2	..
Medical and Surgical Memorial Hospital, San Antonio	100	..	12	..
Hillcrest Memorial Hospital, Waco	75	..	12	..
St. Joseph's Hospital, Wellington	20	..	..	..
UTAH				
Federal				
Uintah and Ourah Agency Hospital, Ft. Duchesne	28	..	..	..
Private				
Holy Cross Hospital, Salt Lake City	200	..	10	..
St. Mark's Hospital, Salt Lake City	150	16	9	14
VERMONT				
Private				
Mary Fletcher Hospital, Burlington	135	..	..	..
VIRGINIA				
Federal				
Station Hospital, Ft. Myer	82	..	8	..
Veterans Admin. Facility, Kecoughton	80	..	26	1
VIRGINIA—Continued				
Station Hospital, Langley Field	63	..	3	..
Norfolk Naval Hospital, Portsmouth	448	18	36	12
State				
University of Virginia Hospital, Charlottesville	338	14	..	..
Private				
Rockingham Memorial Hospital, Harrisonburg	129	..	20	..
WASHINGTON				
Federal				
U. S. Naval Hospital, Bremerton	263	4	10	2
Station Hospital, Ft. Lewis	167	2	..	..
Colville Hospital, Nespelem	40	4	18	7
Station Hospital, Vancouver	118	..	..	..
County				
Pierce County Hospital, Tacoma	198	8	26	..
Private				
Columbus Hospital, Seattle	200	4	26	1
Memorial Hospital, Sedro Wooley	30	2	..	..
South Bend General Hospital, South Bend	21	3	3	..
Deaconess Hospital, Spokane	185	..	8	..
WEST VIRGINIA				
Federal				
Veterans Admin. Facility, Huntington	210	7	85	7
Private				
Charleston General Hospital, Charleston	255	..	61	..
Laird Memorial Hospital, Montgomery	127	..	6	..
Wheeling Hospital Wheeling	240	10	16	..
WISCONSIN				
Federal				
Hayward Indian Hospital, Hayward	55	15	76	8
Tomah Indian Hospital, Tomah	42	12	30	1
County				
Milwaukee County Hospital, Wauwatosa	1,050	..	174	..
Private				
Luther Hospital, Eau Claire	155	3	10	..
Kenosha Hospital, Kenosha	180	..	3	..
Grandview Hospital, La Crosse	106	..	2	..
St. Francis Hospital, La Crosse	250	5	20	2
Columbia Hospital, Milwaukee	150	..	7	2
Misericordia Hospital, Milwaukee	110	..	7	..
St. Mary's Hospital, Wausau	130	..	22	..
WYOMING				
Federal				
Wind River Indian Hospital, Ft. Washakie	44	5	11	4
Veterans Admin. Facility, Cheyenne	108	..	8	..
Private				
Wheatland General Hospital, Wheatland	48	..	2	..

TUBERCULOSIS DEPARTMENTS OF MENTAL HOSPITALS

	Total Capacity of Hospital	Tuberculosis Department: Beds	Tuberculosis Department: Patients Admitted	Tuberculosis Department: Patients Present
ARKANSAS				
Federal				
Veterans Admin. Facility, North Little Rock	1,347	28	12	28
State				
State Hospital, Benton Division, Haskell	1,750	50	..	..
CALIFORNIA				
State				
Mendocino State Hospital, Talmage	2,896	..	..	..
CONNECTICUT				
State				
Connecticut State Hospital, Middletown	3,315	120	..	115
DELAWARE				
State				
Delaware State Hospital, Farnhurst	1,169	17	17	..
FLORIDA				
State				
Florida State Hospital, Chattahoochie	4,297	71	56	53
ILLINOIS				
Federal				
Veterans Admin. Facility, Danville	1,788	29	..	..
State				
Chicago State Hospital, Chicago	4,288	75	75	75
East Moline State Hospital, East Moline	2,240	68	..	59
Elgin State Hospital, Elgin	4,614	100	62	66
Jacksonville State Hospital, Jacksonville	3,403	85	13	74
Kankakee State Hospital, Kankakee	4,111	97	..	..
Manteno State Hospital, Manteno	5,293	104	2	..
Illinois Security Hospital, Menard	475	10	2	..
INDIANA				
Federal				
Veterans Admin. Facility, Veterans Administration Hospital	1,506	80	19	71
IOWA				
State				
Cherokee State Hospital, Cherokee	1,700	72	16	78
Iowa Institute for Feebleminded Children, Glenwood	1,854	47	47	..
KENTUCKY				
Federal				
U. S. Public Health Service Hospital, Lexington	1,000	28	24	22
KENTUCKY—Continued				
State				
Western State Hospital, Hopkinsville	1,920	154	..	148
Central State Hospital, Lakeland	2,469	74	..	..
Eastern State Hospital, Lexington	1,873	30	..	..
MAINE				
State				
Bangor State Hospital, Bangor	1,106	43	18	39
Pownal State School, Pownal	110	..	4	13
MARYLAND				
Federal				
Veterans Admin. Facility, Perry Point	1,391	48	6	43
State				
Crownsville State Hospital, Crownsville	1,455	..	..	36
MASSACHUSETTS				
State				
Boston State Hospital, Boston	2,500	55	..	52
Danvers State Hospital, Danvers	2,423	48	..	46
Foxboro State Hospital, Foxboro	1,426	54	27	51
Northampton State Hospital, Northampton	2,096	20	6	20
Taunton State Hospital, Taunton	1,730	52	21	51
MICHIGAN				
Federal				
Veterans Admin. Facility, Camp Custer	1,010	25	6	24
State				
Ionia State Hospital, Ionia	932	55	..	..
Kalamazoo State Hospital, Kalamazoo	2,765	89	..	89
Lapeer State Home Training School, Lapeer	3,938	79	30	71
Pontiac State Hospital, Pontiac	1,825	79	..	..
Traverse City State Hospital, Traverse City	2,340	130	15	18
Ypsilanti State Hospital, Ypsilanti	2,370	40	19	34
MINNESOTA				
Federal				
Veterans Admin. Facility, St. Cloud	1,046	20	8	17
State				
St. Peter State Hospital, St. Peter	2,273	145	56	142

TUBERCULOSIS DEPARTMENTS OF MENTAL HOSPITALS—Continued

	Total Capacity of Hospital	Tuberculosis Department		
		Beds	Patients Admitted	Patients Present
State — MISSISSIPPI				
East Mississippi State Hospital, Meridian	850	40	..	36
Federal — MISSOURI				
Medical Center for Federal Prisoners, Springfield	549	68	46	..
City				
City Sanitarium, St. Louis	3,600	40	24	35
State — NEBRASKA				
Hastings State Hospital, Ingleside	1,068	86	..	..
State — NEW JERSEY				
New Jersey State Hospital, Greystone Park	5,362	190	124	186
New Jersey State Hospital, Marlboro	2,311	100	90	88
New Jersey State Hospital, Trenton	2,850	240	125	233
North Jersey Training School, Totowa	690	..	1	..
County				
Essex County Hospital, Cedar Grove	2,506	171	18	64
Federal — NEW YORK				
Veterans Admin. Facility, Canandaigua	1,115	26	13	13
State				
Binghamton State Hospital, Binghamton	2,974	104	6	90
Pilgrim State Hospital, Brentwood	8,860	102	102	21
Central Islip State Hospital, Central Islip	7,164	236	..	199
Clinton Prison General and Tuberculosis Hospital, Dannemora	133	73	32	65
Gowanda State Homeopathic Hospital, Helmuth	2,228	174	21	86
Kings Park State Hospital, Kings Park	5,954	396	144	384
Middleton State Homeopathic Hospital, Middleton	3,392	102	42	86
Marcy State Hospital, Marcy	2,733	160	..	101
Institution for Male Defective Delinquents, Napanoch	28	4	3	2
St. Lawrence State Hospital, Ogdensburg	2,226	119	8	103
Hudson River State Hospital, Poughkeepsie	4,465	216	79	241
Rochester State Hospital, Rochester	3,384	88	24	74
Willard State Hospital, Willard	3,065	88	21	88
Harlem Valley State Hospital, Wingdale	4,800	141	48	124
State — NORTH DAKOTA				
Grafton State School, Grafton	1,093	4	4	..
Federal — OHIO				
Veterans Admin. Facility, Chillicothe	1,102	29	3	28
State				
Institution for Feebleminded, Columbus	2,075	20	5	..
OHIO—Continued				
Dayton State Hospital, Dayton	1,741	96	..	..
Columbus State Hospital, Columbus	2,659	60	43	47
Ohio Hospital for Epileptics, Gallipolis	2,274	35	..	30
Massillon State Hospital, Massillon	3,164	74	..	74
Federal — PENNSYLVANIA				
Veterans Admin. Facility, Coatesville	1,461	40	..	31
State				
Allentown State Hospital, Allentown	1,650	95	12	92
Danville State Hospital, Danville	2,082	88	..	..
Harrisburg State Hospital, Harrisburg	1,921	140	..	..
Pennhurst State School, Pennhurst	1,746	..	..	..
Warren State Hospital, Warren	2,300	25	..	..
County				
Blakely Home, Olyphant	157	6	..	5
Retreat Mental Hospital, Retreat	1,075	40	1	46
Allegheny County Home and Hospital for Insane, Woodville	1,275	247	209	236
City				
Pittsburgh City Home and Hospital, Mayview	2,852	80	30	78
Private				
Elwyn Training School, Elwyn	1,075	46	..	..
State — RHODE ISLAND				
State Hospital for Mental Diseases, Howard	3,000	83	22	50
State — TENNESSEE				
Eastern State Hospital, Knoxville	1,570	94	..	83
Central State Hospital, Nashville	1,838	63	..	..
Federal — TEXAS				
Veterans Admin. Facility, Waco	947	8	..	..
State				
Rusk State Hospital, Rusk	2,224	181	..	..
State — VIRGINIA				
State Colony for Epileptics and Feebleminded, Colony	1,300	62	7	52
Central State Hospital, Petersburg	3,582	96	39	71
Western State Hospital, Staunton	2,438	70	15	47
Federal — WASHINGTON				
Veterans Admin. Facility, American Lake	710	8	7	6
State				
Western State Hospital, Ft. Steilacoom	2,604	112	..	..
Eastern State Hospital, Medical Lake	1,960	60	..	..
Federal — WYOMING				
Veterans Admin. Facility, Sheridan	579	15	7	10

OTHER TUBERCULOSIS DEPARTMENTS

	Total Capacity of Hospital	Tuberculosis Department		
		Beds	Patients Admitted	Patients Present
State — ALABAMA				
Kilby Prison Hospital, Montgomery	105	50	18	43
County — ARKANSAS				
Sebastion County Hospital, Ft. Smith	80	22	..	..
Federal — CALIFORNIA				
U. S. Penitentiary Hospital, Alcatraz	23	3	..	..
State				
Charles L. Neumiller Memorial Hospital, San Quentin	200	55	32	49
Private				
Sante Fe Coast Lines Hospital, Los Angeles	150	..	..	..
Lane Sanitarium, San Diego	10	8	17	5
Southern Pacific Gen. Hospital, San Francisco	400	..	52	..
State — COLORADO				
Colorado State Penitentiary Hospital, Canon City	40	6	4	6
County				
Island Grove Hospital, Greeley	60	..	13	1
Private				
Temple Sanitarium, Englewood	35	20	20	20
State — CONNECTICUT				
Connecticut State Prison Hospital, Wetherfield	50	8	4	1
City — DISTRICT OF COLUMBIA				
District of Columbia Reformatory Hospital, Washington	80	16	27	21
State — FLORIDA				
Florida State Farm Hospital, Raiford	95	19	30	19
County				
Pinellas County Home, Largo	38	38	38	14
Federal — GEORGIA				
U. S. Penitentiary Hospital, Atlanta	187	6	28	6
State — IDAHO				
University of Idaho Infirmary, Moscow	30	..	..	..
State — ILLINOIS				
Illinois State Penitentiary Hospital, Menard	38	14	26	..
Illinois State Penitentiary Hospital, Pontiac	40	14	18	25
Private				
St. John's Sanitarium, Springfield	300	200	341	167
State — INDIANA				
Indiana State Reformatory Hospital, Pendleton	120	16	..	..
State — IOWA				
Iowa State College Hospital, Ames	75	..	..	..
Men's Reformatory Hospital, Anamosa	25	..	1	..
Iowa State Penitentiary Hospital, Ft. Madison	35	8	..	..
Iowa State Soldier's Home Hospital, Marshalltown	180	..	1	..
Federal — KANSAS				
U. S. Penitentiary Annex Hospital, Ft. Leavenworth	175	15	38	..
U. S. Penitentiary Hospital, Leavenworth	180	5	36	..
State — KENTUCKY				
State Prison Hospital, La Grange	65	15	23	9
Private — MAINE				
Restland, East Parsonfield	50	25	10	10
State — MARYLAND				
Maryland Penitentiary Hospital, Baltimore	50	14	20	12
Maryland House of Correction, Jessup	47	7	12	2

OTHER TUBERCULOSIS DEPARTMENTS—Continued

	Total Capacity of Hospital	Tuberculosis Department: Beds	Tuberculosis Department: Patients Admitted	Tuberculosis Department: Patients Present
Private **MARYLAND**—Continued				
James Lawrence Kernan Hospital, Baltimore..	80	..	..	..
State **MASSACHUSETTS**				
Hospital of Norfolk State Prison Colony, Norfolk	75	27	22	18
Private				
Robert Breck Brigham Hospital, Boston.....	115	..	..	..
New England Peabody Home, Newton Center	100	..	11	67
Shriner's Hospital for Crippled Children, Springfield	60	..	..	2
State **MICHIGAN**				
Michigan State Prison Hospital, Jackson.....	200	50	17	..
Central Michigan Children's Hospital, Traverse City	26	..	13	..
Private				
Children's Hospital, Detroit.....	239	..	56	..
State **MINNESOTA**				
Minnesota State Reformatory Hospital, St. Cloud	30	16	25	16
Gillette State Hospital for Crippled Children, St. Paul	250	..	37	..
State **MISSOURI**				
Missouri State Penitentiary Hospital, Jefferson City	230	40	..	..
Private				
Missouri Odd Fellows Home and Hospital, Liberty	85	1	1	..
Missouri Pacific Hospital, St. Louis.....	300	..	55	..
Shriners' Hospital for Crippled Children, St. Louis	100	10	62	6
State **NEBRASKA**				
Nebraska State Penitentiary Hospital.....	22	5	..	3
State **NEW JERSEY**				
New Jersey Reformatory Hospital, Rahway...	16	2	7	2
New Jersey State Prison Hospital, Trenton...	42	10	10	7
State **NEW MEXICO**				
New Mexico Penitentiary Hospital, Santa Fe..	45	8	5	5
Private				
A. T. & S. F. Hospital, Albuquerque.....	67	13	32	9
State **NEW YORK**				
Clinton Prison General and Tuberculosis Hospital, Dannemora	133	73	32	65
Private **NEW YORK**—Continued				
Seaside Hospital, Staten Island.....	196	16	16	12
State **NORTH CAROLINA**				
North Carolina Orthopedic Hospital, Gastonia	160	43	75	..
County				
Durham County Infirmary, Durham.....	24	24	63	..
State **OHIO**				
Ohio Penitentiary Hospital, Columbus.....	125	..	53	15
Girls Industrial School Hospital, Delaware....	32	8	..	..
Harmon Hospital, Marysville	34	2	..	..
Federal **OKLAHOMA**				
U. S. Southwestern Reformatory, El Reno....	40	3	3	1
State **OREGON**				
Oregon State Penitentiary Hospital, Salem....	32	4	..	4
State **PENNSYLVANIA**				
Western State Penitentiary Hospital, Bellefonte	22	2	2	..
State Hospital for Crippled Children, Elizabethtown	125	30	24	..
Eastern State Penitentiary Hospital, Philadelphia	80	18	8	13
Western Penitentiary Hospital, Pittsburgh...	30	..	..	9
County				
Erie County Home, Girard.....	32	32	88	..
Retreat Home for Chronic Diseases, Retreat..	500	22	8	10
City-County				
Philadelphia County Prison Hospital, Philadelphia	50	6	30	..
Private				
Children's Hospital, Philadelphia.....	134	6	..	..
St. Christopher's Hospital for Children, Philadelphia	82	..	7	..
Private **UTAH**				
Primary Children's Hospital, Salt Lake City..	35	..	..	..
State **VERMONT**				
Vermont State Prison Hospital, Windsor.....	12	1	1	1
State **VIRGINIA**				
State Farm Hospital, State Farm.....	100	50	26	32
Federal **WASHINGTON**				
U. S. Penitentiary Hospital, Steilacoom.....	85	6	18	6
State **WISCONSIN**				
Wisconsin State Reformatory, Green Bay.....	10	1	3	..
Wisconsin State Prison Hospital, Waupun....	21	5	..	5

PREVENTORIUMS

	Control	Bed Capacity	Patients Admitted	Census
ARIZONA				
Pima County Preventorium, Tucson.....	County	130	185	..
CALIFORNIA				
Bloss Memorial Hospital, Atwater.....	County	51	..	..
Chas. S. Howard Foundation, Belmont...	NPAssn	20	..	..
Thomas B. Swift Preventorium, Clayton..	County	21	53	..
Kern County Preventorium, Keene.....	County	44	57	39
Monrovia Health Camp, Monrovia.....	NPAssn	90	61	64
Pasadena Preventorium, Pasadena.....	NPAssn	40	43	39
Rest Haven Preventorium, San Diego.....	NPAssn	100	72	..
San Mateo Preventorium.....	NPAssn	28	15	18
DELAWARE				
Sunnybrook Cottage Preventorium, Marshallton	NPAssn	24	15	20
FLORIDA				
Hope Haven, Jacksonville.....	NPAssn	25	137	..
GEORGIA				
Kiwanis Sunshine Preventorium, Savannah	NPAssn	15	..	..
ILLINOIS				
Ridge Farm Preventorium, Deerfield.....	NPAssn	48	100	..
MASSACHUSETTS				
Prendergast Preventorium, Boston.....	NPAssn	135	306	52
MICHIGAN				
American Legion Children's Billet, Otter Lake	NPAssn	30	..	..
MINNESOTA				
Children's Preventorium of Ramsey County, St. Paul.....	CyCo	80	88	75
MISSOURI				
Night and Day Camp for Children, St. St. Louis	NPAssn	81	34	..
NEW JERSEY				
Tuberculosis Preventorium for Children, Farmingdale	NPAssn	225	628	219
NEW YORK				
Van Rensselaer Preventorium, Albany.....	NPAssn	50	..	41
Ontario County Preventorium, Canandaigua	NPAssn	20	4	10
Chemung County Preventorium, Elmira..	County	22	33	17
St. Agatha Preventorium, Nanuet.....	NPAssn	165	458	..
NORTH DAKOTA				
Ft. Totten Preventorium,* Ft. Totten....	Federal	80	100	63
OHIO				
Children's Fresh Air Camp and Hospital, Cleveland	NPAssn	60	230	..
Nightingale Cottage, Reynoldsburg.....	NPAssn	40	65	40
PENNSYLVANIA				
River Crest Preventorium, Mont Clare...	NPAssn	100	231	80
Preventorium Unit of Berks County Tuberculosis Sanatorium, Reading.....	County	88	..	..
RHODE ISLAND				
Lakeside Home and Mary Murray Preventorium, Hoxsie	NPAssn	68	125	43
TENNESSEE				
Cheerfield Farm, Raleigh.....	CyCo	50	77	..
VERMONT				
Caverley Preventorium, Pittsford.....	NPAssn	80	106	70
WISCONSIN				
Blue Mound Preventorium, Wauwatosa...	County	134	85	..

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The American Medical Association advocates:

1. The establishment of an agency of the federal government under which shall be coordinated and administered all medical and health functions of the federal government exclusive of those of the Army and Navy.

2. The allotment of such funds as the Congress may make available to any state in actual need, for the prevention of disease, the promotion of health and the care of the sick on proof of such need.

3. The principle that the care of the public health and the provision of medical service to the sick is primarily a local responsibility.

4. The development of a mechanism for meeting the needs of expansion of preventive medical services with local determination of needs and local control of administration.

5. The extension of medical care for the indigent and the medically indigent with local determination of needs and local control of administration.

6. In the extension of medical services to all the people, the utmost utilization of qualified medical and hospital facilities already established.

7. The continued development of the private practice of medicine, subject to such changes as may be necessary to maintain the quality of medical services and to increase their availability.

8. Expansion of public health and medical services consistent with the American system of democracy.

THE TUBERCULIN TEST AND X-RAYS IN MASS SURVEYS FOR TUBERCULOSIS

Tuberculins have been used successfully in the detection of primary and calcified tuberculous lesions for a generation. Nevertheless, discussion[1] still seeks to clarify their value, limitations and relation to the more accurate x-ray film. The problem is less one of ascertaining how many persons have been infected in a given community than to select for more careful study a relatively small number of suspected persons from a large number of people who are presumably well; especially is it important to isolate those with really active pulmonary lesions. In view of the general decline of tuberculosis and the lessened opportunity for reinfection, the number of nonreactors to tuberculin may be expected to increase. Whether or not the percentage of the tuberculin positive in a community will decline proportionately with the death rate is problematic. Conceivably, tuberculin reactions may eventually become negative in all cases of calcified primary lesions if further infection does not occur.

The overwhelming majority of patients with frank tuberculosis react even to small doses of most tuberculins on the market. It is claimed that proved records do not exist of the development of the disease in the absence of a positive reaction and consequently that a negative tuberculin test excludes active tuberculosis with a high degree of probability. Tuberculin tests are regarded by individual proponents as diagnostically reliable in from 90 to 95 per cent of primary and calcified lesions in mass surveys in which special hazards do not exist. The failure to disclose the residual cases is attributed chiefly to the fact that persons previously tuberculin positive become tuberculin negative. Among 2,490 persons examined by the staff of the Henry Phipps Institute of the University of Pennsylvania and found positive to tuberculin on the first or a subsequent examination, 276 (11 per cent) became negative either transiently or for the remainder of the period of observation. The initial intensity of the disease and the degree of household exposure had much to do with the waning allergy. Tuberculin anergy in certain well known clinical conditions does not enter into the discussion. The conviction that the tuberculin test is rarely negative in the presence of significant tuberculosis acquires support from a survey of 500 adults tested at the Herman Kiefer Hospital, Detroit, with the x-rays in which nine failed to respond to the usual doses. Retesting by means of 10 mg. of old tuberculin brought out one more positive response. All of the nonreactors, except one, had the disease in the terminal stage. On the other hand, in a survey of 4,271 white persons with calcifications but without evidence of manifest tuberculosis conducted in Giles County, Tenn., the incidence of a tuberculin-negative response was 34.2 per cent. This lack of tuberculous specificity occurred at all ages. Results like these clearly place the burden of proof on the determination that all such lesions are tuberculous.

Tuberculin allergy may be so universal in adolescents and adults in certain geographic areas such as Puerto Rico that the tuberculin test has little validity beyond the age of 10. Possibly in mass surveys a large number of the population may refuse the needle, as in the survey at Hagerstown, Md., where 40 per cent voiced their refusal. It is conceded that tuberculin tests are unusually advantageous in infants because of the difficulty of securing uniformly good x-ray films of the chest. Their usefulness for control purposes is challenged in school children and adolescents because of the low incidence of active disease compared with the number of infections.

1. Long, Esmond R.; Douglas, Bruce, H.; Doull, James A.; Dearing, W. Palmer; Ianne, Charles L., and Pastor, J. Rodriguez: A Symposium on Mass Tuberculin Testing and X-Raying, Am. Rev. Tuberc. **40**: 607 (Dec.) 1939.

In 1,542 school children between the ages of 10 and 19 given the tuberculin test in Philadelphia, only fourteen cases of "manifest tuberculosis" were discovered, a ratio of 108 to 1. Single dose Mantoux testing is regarded by one investigator as a reasonably effective screen for case finding when the cost limits the number of x-ray examinations. Criticisms voiced against defects inherent in tuberculin testing, such as lack of standardization of tuberculin preparations, lack of uniformity of dosage and the varying classifications of the degree of reaction, are not new and will speed improvements of the technic.

The x-ray film is still the basic tool in case finding. An x-ray examination can be carried out with less inconvenience to the public and requires fewer visits. It possesses greater accuracy. The cost, to be sure, is greater. It is not free from certain imperfections, for it may reveal too much and again too little. Interference with accuracy may arise from the fact that not all calcium deposits discovered are tuberculous or that a complete view of the lung field may be obstructed by mediastinal and heart shadows or be due to the lack of experience required to interpret the film correctly. Ordinary lesions may often be present elsewhere than in the visual pulmonary field and reinfection may be hidden. The x-ray film, moreover, does not reveal infection until after it has caused a shadow in the lung. An instance is cited from the Santa Clara County Sanatorium at San Jose, Calif., in which a pregnant woman negative on x-ray examination proved positive to the tuberculin test. Further examination revealed that the husband harbored an occult minimal tuberculosis with positive sputum. A legitimate inference would be that a man's prophylaxis against tuberculosis, like his education, should begin before he is born. Only two deaths from tuberculosis in the first year of life have been reported since 1934 for Santa Clara County, with a mixed urban and rural population of 160,000. Early diagnosis permitted the early institution of collapse therapy and a normal pregnancy without extension of the pulmonary disease.

New types of x-ray examination intended to reduce the cost of mass surveys, such as the fluoroscope, sensitized paper, the use of 14 by 14 films instead of the usual 14 by 17 (resulting in a saving of 20 per cent in film cost) and miniature chest films made by photographing the fluoroscopic image on 4 by 5 inch films, offer inviting prospects of economy. The praise of the fluoroscope is sung as a case-finding mechanism for the geographic area in which tuberculin allergy in adolescents and adults is universal, and fluoroscopes are reported to be installed in every public health unit. A leading insurance company known for its investigations in public health is reported as having made fluoroscopic examinations of 25,000 persons at an average cost of 15 cents. It also found that an accurate diagnosis as to the presence or absence of pulmonary tuberculosis could be made with the fluoroscope alone in 87 per cent of 2,603 persons examined. In a cooperative survey made by the Michigan State Health Department, the U. S. Public Health Service and the Michigan Sugar Beet Growers Association, 4,000 Mexicans to be transported for summer work were examined with the newest type of portable fluoroscope and eighty-one cases of pulmonary tuberculosis were discovered. When the less expensive methods of x-ray examinations are perfected, the tuberculin test may be confined to the determination of tuberculous infections in infants and young children and to cases of atypical lesions in adults harboring tubercle bacilli. In doubtful cases, confirmation will continue to be sought in tuberculin, sputum analysis and other clinical evidence. Preliminary tuberculin screening may continue to hold the field for some time.

ALLERGY AND ANAPHYLAXIS IN TUBERCULOSIS

The debated question as to whether allergic and anaphylactic manifestations in experimental tuberculosis are basically similar or different has been reinvestigated by Corper.[1] His results strongly support the view that the phenomena are of fundamentally different nature. Significant facts partly here reported and partly cited seem to establish the following facts: Guinea pigs which receive intravenous injections of protein from tubercle bacilli are sensitized so that typical anaphylactic shock is caused by later injection of this protein. The sensitization can be transferred passively to normal guinea pigs with the blood. However, guinea pigs rendered "allergic" by infection with a strain of tubercle bacilli of low virulence do not demonstrate the characteristic anaphylactic type of hypersensitiveness when injected with the tuberculoprotein. In appropriate amounts the latter will kill such pigs, but only after several hours, a type of death in clear contrast to the rapidly occurring death of anaphylaxis.

By an ingenious experiment Corper was able to induce the two types of sensitization in the same animal. In a typical experiment a pair of guinea pigs were made allergically sensitive by infection with a millionth of a milligram of virulent human type tubercle bacilli. One of these had previously been given an anaphylactically sensitizing dose of tuberculoprotein. Three months after the infection with tubercle bacilli each pig was given 0.8 mg. of tuberculoprotein. The animal not sensitized before its injection died five hours later from the general reaction characteristic of allergy in the skin-sensitive animal. The other was thrown immediately into acute anaphylactic shock but recovered, only to die from the more protracted shock characteristic of allergic response and in exactly the same length of time as the other animal.

1. Corper, H. J.: Analysis of the Tubercle Bacillus and Its Natural Products by Immune, Allergic and Anaphylactic Tests, J. Infect. Dis. **66**: 23 (Jan.-Feb.) 1940.

Naturally such an experiment should be repeated to make certain that the result can be considered a constant phenomenon. Corper's report, however, adds new evidence to the growing view that tuberculin allergy and anaphylactic shock are basically different. The results have definite connotations for our understanding of resistance, for, as he points out, the allergic sensitization is at least associated with increased resistance to infection, whereas animals sensitized only anaphylactically, by injection of the protein without infection, display no increased resistance. For the latter the bacillary body seems vital.

Current Comment

TUBERCULOSIS HOSPITALIZATION

In the survey of tuberculosis hospitalization by the Council on Medical Education and Hospitals published in this issue of THE JOURNAL, it is shown that the sanatoriums, tuberculosis departments and preventoriums admitted 122,342 patients in 1938, treated 202,021 and maintained an average daily census of 79,300. This represents an annual expenditure of over seventy million dollars for hospital care, not including the loss of earning power of the patients or the care of dependents. Tuberculosis is therefore still a great economic problem. The survey reveals also an increasing use of sanatorium facilities for far advanced cases, a trend which will aid in decreasing dangerous foci of infection. However, the continued hospitalization of nontuberculous children in some of the sanatoriums for adult tuberculosis is fraught with danger if separate units are not maintained. When additional beds are required for the care of patients it would seem logical to convert preventorium units to sanatorium use, for the isolation of open cases has proved more effective in the prophylaxis of tuberculosis than the hospitalization of tuberculous contacts. There are 98,801 beds available in this country for tuberculous patients, including 4,830 assigned to preventorium care. While additional beds are needed in various communities, the evaluation of sanatorium needs can better be assigned to members of the medical profession and other agencies familiar with local conditions. Institutional care is a vital factor in the prevention and treatment of tuberculosis. From an epidemiologic point of view, segregation and therapy accomplish the same result in removing foci of infection from the community, and that is the essence of tuberculosis control.

INTERNAL PRESSURE WAVES OF MUSCLE MOTION

To the physician abnormal spasms and dystrophy of muscles are significant in diagnosis. The tone of muscle is an index of health. Any contribution to the underlying mechanics of motion in muscles is clinically significant. A full explanation of muscular contraction involves research in histology, physiology, chemistry, roentgenology and other fields. There is no adequate explanation at present of the mechanism by which shortening, firmness and strength of muscle are produced, the nature of the energy thus transformed into mechanical work and the relation of this energy to the chemical reactions that take place in the stimulated muscle. The measurable manifestations of energy that are observed in the contracting muscle are the changes in chemical constitution, electrical potential, heat and mechanical work. The purely physiologic approach to the problem of motion in muscles pushes the refinements of analysis into time rather than space. Even if one knew precisely at what stage the chemical energy that is transformed into mechanical work is liberated one would still fail to know the actual machinery of contraction. The histologic method has made little advance in our knowledge of the structure of muscle during relative rest and variable degrees of motion. The recent demonstrations by Carey [1] that there is multiplication of the transverse muscle striae associated with a sudden rise in temperature within physiologic limits and that prolonged cooling results in subtraction point to an intimate association between these periodic muscle structures and the rate of rhythmic chemical change. The muscle striae are apparently not fixed static membranes but are the structural expressions of an underlying dynamic mechanism. Carey and Zeit,[2] furthermore, have demonstrated that the strongly active muscle fibers have their inorganic salts arranged in an alternate series of waves of condensations and rarefactions. Elsewhere in this issue of THE JOURNAL, Carey [3] presents additional experimental evidence that different chemical reactions in gels confined within microscopic capillary glass tubules with dimensions approaching those of a skeletal muscle fiber are associated with periodic stratifications similar in arrangement and number to the cross striae and contraction waves in smooth and skeletal muscles. He observes a moving explosive wave front in the microcapillary glass tubules which he interprets as a result of the multiple microscopic pressure waves associated with the periodic mass action of chemical changes. The phenomenon of "interference," which is a crucial test of wave mechanics, appears to be demonstrated for both the striae in muscle and those in gels confined in microscopic glass tubules under adequate physical and chemical conditions. If future research confirms these observations and interpretations, a start will have been made in bridging the important gap in normal and abnormal muscle motions as regards the means by which chemical energy is transformed into mechanical energy. There appear to be concomitant microscopic waves of internal compression associated with chemical reactions. The detection of these micromechanical waves is dependent on confining the chemical reactions of the gel within a microcapillary tubular space which orients and concentrates the pressure waves expressed as alternate dark and light bands of variable number and patterns in both microscopic glass tubules and muscle fibers and fibrils.

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1. Carey, E. J.: Thermal and Capillary Effects on the Quantitative Variability and Orientation of Muscle Cross Striae, Anat. Rec. **73** (supp. 2): 11 (March) 1939.
2. Carey, E. J., and Zeit, Walter: Micro-Incineration of Active Smooth, Transitional and Skeletal Muscles, Proc. Soc. Exper. Biol. & Med. **41**: 31 (May) 1939.
3. Carey, E. J.: Liesegang and Muscle Pressure Waves, this issue, p. 753.

ORGANIZATION SECTION

MEDICAL LEGISLATION

MEDICAL BILLS IN CONGRESS

Change in Status.—S. 685, proposing to create a Bureau of Water Pollution Control in the Public Health Service, passed the Senate May 1, 1939, and was thereafter reported to the House of Representatives with recommendation that it pass. Among other things, this bill provided for federal grants-in-aid to assist states, municipalities and public bodies to construct treatment works to prevent pollution of navigable waters. On February 20 the House Committee on Rivers and Harbors recommended in a supplemental report that the grants-in-aid provision be stricken from the bill and that there be substituted an authorization whereby the Reconstruction Finance Corporation may make loans to finance the construction of treatment works.

Bills Introduced.—S. 3415, introduced by Senator Schwellenbach, Washington, proposes to authorize the Secretary of Interior to establish, construct, equip and operate a hospital for the legally adjudged insane of Alaska, the hospital to be constructed at Bellingham, Wash. H. R. 8378, introduced by Representative Lea, California, proposes that the Secretary of Labor be directed to cancel the outstanding order and warrant of deportation in the case of Dr. Filiberto A. Bonaventura. H. R. 8542, introduced, by request, by Representative May, Kentucky, proposes to authorize the appointment of female dietitians and female physical therapy aides in the Medical Department of the Army. H. R. 8547, introduced by Representative Starnes, Alabama, proposes to authorize loans to public bodies and nonprofit organizations for hospital, water, sewer, stream pollution control and related projects and facilities. H. R. 8613, introduced by Representative Van Zandt, Pennsylvania, proposes that any person who served as a member of the army nurse corps or of the navy nurse corps during the World War and continuously thereafter until May 13, 1926, and who was, prior to June 20, 1930, separated from the corps by reason of physical disability incurred in line of duty, shall, on her application therefor, be entitled to be placed on the retired list of the Nurse Corps. H. R. 8615, introduced by Representative Marcantonio, New York, proposes that the Works Progress Administration shall immediately employ not less than 3,000,000 persons and that there be created a Federal Unemployment Assistance Administration to distribute grants of unemployment assistance to the various states that have set up a state relief plan in compliance with the standards approved by the Unemployment Assistance Administration. Among other things, the bill provides, relief plans must provide medical or surgical treatment or care by physicians or institutions of the relief recipient's choice, subject to a schedule of uniform fees as determined by the local relief administration. H. R. 8631, introduced by Representative South, Texas, proposes a federal appropriation of $450,000 to construct a domiciliary unit at the veterans' facility at Legion, Texas, of sufficient capacity to accommodate 400 veterans.

DISTRICT OF COLUMBIA

Bills Introduced.—S. 3425, introduced by Senator King, Utah, and H. R. 8587, introduced by Representative Kennedy, Maryland, propose to provide for the reorganization of the Government of the District of Columbia. Among other things, these bills provide that in selecting a health officer the Commissioners of the District of Columbia may request the President of the United States to designate an officer from among the medical officers in the United States Army Medical Corps, the United States Navy Medical Corps or the United States Public Health Service, and that the President, in his discretion, may designate such an officer who shall, during the time specified by the President, be health officer of the District. These bills also propose to abolish the office of coroner and to establish the office of medical examiner to function under the direction of a chief medical examiner appointed by the Commissioners of the District and who must be "a doctor of medicine and a skilled pathologist with not less than two years' actual experience as a pathologist." A new License Department, it is proposed, will be created on which will devolve the duties heretofore exercised by various boards, departments, offices and commissions, including the Commission on Licensure to Practice the Healing Arts. The Commissioners of the District will be authorized to appoint licensing and examining boards.

STATE MEDICAL LEGISLATION

Kentucky

Bills Introduced.—H. 403 proposes that no physician, chiropractor, osteopath, chiropodist, dentist or pharmacist shall practice his occupation or profession until he has first paid $6 and obtained a license from the county court clerk of the county wherein he proposes to practice. H. 446 proposes to enact a law regulating the manufacture, sale, distribution and advertising of foods, drugs, cosmetics and therapeutic devices "which shall be uniform in principle with the Federal Food, Drug and Cosmetic Act of 1938 and with the Federal Trade Commission Act, to the extent to which it outlaws the false advertising of food, drugs, devices and cosmetics." S. 199 and H. 438 propose to regulate the construction and operation of hospitals, both private and governmental, and clinics and require them to be licensed annually by the state board of health.

Bill Passed.—H. 340 passed the house and senate to amend the law prohibiting the issuance of a license to marry unless each party to the proposed marriage presents a physician's certificate as to freedom from venereal disease by proposing that the physician's certificate must state that the party is free from any stage of syphilis infection which is or is likely to become communicable.

Mississippi

Bills Introduced.—H. 381 proposes to prohibit the retail sale or distribution of contraceptive devices or any prophylactic rubber or skin goods for the prevention of venereal diseases except by a licensed physician or a licensed pharmacist. H. 387 proposes to create a charity hospital to be known as the North Mississippi Charity Hospital and to be of sufficient size properly to care for 150 patients or more. H. 261 proposes that more than 0.15 per cent of alcoholic content in the blood shall be prima facie evidence of intoxication.

Bill Passed.—H. 150 passed the house, February 21, proposing to prohibit the retail sale or distribution of barbituric acid and any compound, manufacture, salt, derivative, mixture or preparation of barbituric acid, except on the written prescription of a licensed physician, dentist or veterinarian. The bill further proposes to make it unlawful for any person to have in his possession or custody any drug or medicine containing any quantity of barbituric acid, unless it has been prescribed by a physician, dentist or veterinarian.

New York

Bills Introduced.—S. 1100 and A. 1339 propose to provide at public expense for the correction by surgical or medical treatment and care, or by hospitalization, of remedial physical defects or remedial physical disability of physically handicapped adult unemployed persons in such manner as reasonably may be expected to fit them for remunerative occupations or employment. A. 1477, to supplement the workmen's compensation act, proposes that every employee mentally disabled as a result of an accident arising out of and in the course of his employment shall be entitled to receive, without any deductions from the amount of compensation payable to him, medical care, maintenance and attendance in a public hospital or institution, at the expense of his employer, until such time as the employee is discharged as cured. S. 1220 proposes to permit the sale of hypodermic syringes and hypodermic needles to podiatrists, without the written order of a duly licensed physician or veterinarian.

Rhode Island

Bill Introduced.—S. 131 proposes to grant to physicians treating persons injured by reason of an accident not covered by the workmen's compensation act liens on all rights of action, judgments, settlements or compromises accruing to the injured persons by reason of their injuries.

Virginia

Bills Introduced.—S. 253 proposes to authorize the operation of such nonprofit hospital and medical service plans as may be approved by the state corporation commission. H. 338 proposes to appropriate annually to the state board of health $1,000 for the purchase and distribution without charge of insulin to licensed physicians treating indigent patients suffering from diabetes mellitus. S. 186 proposes that whenever in a civil or criminal proceeding issues arise on what the court deems expert evidence desirable the court may, on its own motion or on the motion of either party to the proceeding, appoint one or more experts, not exceeding three on each issue, to testify at the trial.

OFFICIAL NOTES

THE NEW YORK SESSION

Hotels in New York

On advertising page 41 of this issue of THE JOURNAL is printed a list of New York hotels and rates for rooms that has been furnished by the Subcommittee on Hotels of the Local Committee on Arrangements.

The form printed in the advertising pages may be clipped and, when it has been properly filled in, should be sent at once to Dr. Peter Irving, Chairman of the Subcommittee on Hotels of the Local Committee on Arrangements, Room 1036, 233 Broadway, New York.

Meeting Places

Meeting places at the annual session of the American Medical Association, to be held in New York June 10 to 14, will be as follows:

HOUSE OF DELEGATES: The Waldorf-Astoria, Basildon and Jade rooms.

GENERAL SCIENTIFIC MEETINGS: The Waldorf-Astoria, Ballroom, and the Commodore, Grand Ballroom.

REGISTRATION AND SCIENTIFIC AND TECHNICAL EXHIBITS: Grand Central Palace.

SYMPOSIUM ON HEALTH EDUCATION: Hotel Roosevelt, Grand Ballroom.

WOMAN'S AUXILIARY: Hotel Pennsylvania.

SECTIONS OF THE SCIENTIFIC ASSEMBLY

PRACTICE OF MEDICINE: The Waldorf-Astoria, Ballroom.

SURGERY, GENERAL AND ABDOMINAL: The Commodore, Grand Ballroom.

OBSTETRICS AND GYNECOLOGY: The Commodore, Grand Ballroom.

OPHTHALMOLOGY: Hotel Roosevelt, Grand Ballroom.

LARYNGOLOGY, OTOLOGY AND RHINOLOGY: Hotel Roosevelt, Grand Ballroom.

PEDIATRICS: The Waldorf-Astoria, Ballroom.

PHARMACOLOGY AND THERAPEUTICS: The Biltmore, Music Room.

PATHOLOGY AND PHYSIOLOGY: The Biltmore, Music Room.

NERVOUS AND MENTAL DISEASES: The Biltmore, Ballroom.

DERMATOLOGY AND SYPHILOLOGY: The Commodore, West Ballroom.

PREVENTIVE AND INDUSTRIAL MEDICINE AND PUBLIC HEALTH: Hotel Roosevelt, Hendrik Hudson Room.

UROLOGY: The Commodore, West Ballroom.

ORTHOPEDIC SURGERY: The Biltmore, Ballroom.

GASTRO-ENTEROLOGY AND PROCTOLOGY: Hotel Roosevelt, Hendrik Hudson Room.

RADIOLOGY: The Commodore, East Ballroom.

MISCELLANEOUS TOPICS, SESSION ON ANESTHESIA: The Commodore, East Ballroom.

ADDRESSES BY OFFICIAL STAFF

DR. PAUL C. BARTON:

March 19—Open meeting under auspices of St. Joseph Clinical Society, St. Joseph, Mo.
March 20—St. Joseph Clinical Society.
March 20—Woman's Auxiliary to Buchanan County Medical Society, St. Joseph, Mo.

DR. W. W. BAUER:

March 4- 5—General Advisory Committee on Maternal and Child Welfare Services, Children's Bureau, Washington, D. C.
March 10—Kollege Klub, Evanston, Ill.
March 11—Automotive Boosters Club No. 7, Chicago.
March 12—Bryn Mawr Parent Teacher Association, Chicago.
March 26—Allegheny County Medical Society Auxiliary, Pittsburgh.
April 1—Woman's Club, Stevens Point, Wis.
April 1—Rotary Club, Stevens Point, Wis.
April 1—High School, Stevens Point, Wis.
April 2—Portage County Medical Society and Auxiliary, Stevens Point, Wis.
April 2—Teacher's College, Stevens Point, Wis.
April 2—Kiwanis Club, Stevens Point, Wis.
April 3—Wilmette Woman's Club, Wilmette, Ill.

DR. MORRIS FISHBEIN:

March 3—Bloomington Forum, Bloomington, Ill.
March 5—Fort Smith Junior College, Fort Smith, Ark.
March 10—South Parkway Branch of the Y. W. C. A., Chicago.
March 11—Uniontown Community Forum, Uniontown, Pa.
March 14—Illinois State Medical Society, Danville, Ill.
March 20—Temple Isaiah Israel, Chicago.
March 26—Executives Club, Knoxville, Tenn.
March 27—Executives Club, Chattanooga, Tenn.
March 31—Academy of Medicine, Rochester, N. Y.

DR. R. G. LELAND:

March 2—Professional Students Clinic, Y. M. C. A., Chicago.

DR. PAUL A. TESCHNER:

March 4—North End Woman's Club, Chicago.
March 6—Marinette County Medical Society Auxiliary and Woman's Club, Marinette, Wis.

DR. NATHAN B. VAN ETTEN:

March 2—Dinner to Dr. Emily Barringer by Kingston Hospital at New York Academy of Medicine, New York.
March 6—Lecture on Ethics, New York University School of Medicine, New York.
March 9—Dinner Class of 1890, Bellevue Hospital Medical College, New York.
March 11—New York Society of Medical Jurisprudence, New York.
March 13—Lecture on Ethics, New York University School of Medicine, New York.
March 14—West Side Clinical Society, New York.
March 19—American Dental Association, Baltimore.
March 25—Radio Broadcast, New York University, New York.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

ALABAMA

Personal.—Dr. Roy J. Settle, formerly of Inman, S. C., has been elected health officer of Clarke County, succeeding Dr. Benjamin S. Black, Grove Hill, who resigned to enter private practice in Chicago.——Dr. John A. Kenney, formerly medical director of the Community Hospital, Newark, N. J., has been appointed to a similar position at the John A. Andrew Memorial Hospital, Tuskegee Institute.——Franklin A. Clark, of the U. S. Public Health Service, has been appointed director of the division of inspection of the state department of health, succeeding C. A. Abele, Ch.E., who left to become director of the division of dairy products of the Chicago Board of Health, newspapers reported, January 18.——Dr. William M. Askew Jr., formerly of Auburn, has been named health officer of Butler County, succeeding Dr. Thomas C. Elliott, Greenville, resigned.

CALIFORNIA

Course in Psychotherapy. — Announcement is made that the course on psychotherapy in general practice at Mount Zion Hospital, San Francisco, will be given March 7, 14, 21 and 28 instead of March 6, 13, 20 and 27 as heretofore announced. Additional information may be obtained from Dr. Jacob Kasanin, chief of the psychiatry service at the hospital, corner of Post and Scott streets, San Francisco.

Director of Child Guidance Clinic.—Dr. Hale F. Shirley, assistant professor of psychiatry, State University of Iowa College of Medicine, Iowa City, has been appointed assistant professor of psychiatry and pediatrics and director of the new child guidance clinic at Stanford University School of Medicine. The Commonwealth Fund recently gave a grant of $10,000 a year for three years to finance the clinic under the direction of the departments of psychiatry and pediatrics. The new clinic will be an expansion of the present work on behavior problems and will provide opportunities for graduate and undergraduate training of physicians in this field. Dr. Shirley graduated at the State University of Iowa College of Medicine in 1927.

Society News. — Dr. Charles E. Smith, San Francisco, addressed the Kern County Medical Society in Bakersfield, January 18, on "Coccidioidal Granuloma in Relation to Erythema Nodosum."——At a meeting of the Riverside County Medical Association in Riverside, January 8, Dr. Robert W. Lamson, Los Angeles, spoke on "Allergy in General Practice."——Dr. Charles W. Barnett, San Francisco, discussed treatment of syphilis before the Yuba-Sutter Medical Society in Marysville, January 9.——At a meeting of the Los Angeles Society of Ophthalmology, February 26, the speakers included Drs. Helen L. Hopkins on "Hysterical Amblyopia in Children" and Harry F. Dietrich, "Arterial Hypertension in Children."——The Los Angeles Heart Association was addressed, February 14, among others, by Drs. Robert W. Langley on "Mediastinal Tumor Associated with Auricular Fibrillation" and Edward W. Boland, "Oxygen for the Relief of Pain in Coronary Thrombosis."

CONNECTICUT

Dr. Bayne-Jones Declines Reappointment as Dean.—Dr. Stanhope Bayne-Jones, since 1935 dean of Yale University School of Medicine, New Haven, has found it impossible to accept reappointment to this position, it is announced. His time will be devoted to other positions as chairman of the executive committee of the division of medicine and public health of the president's committee on university development, as director of the board of scientific advisers of the Jane Coffin Childs Memorial Fund for Medical Research and as professor of bacteriology. Dr. Bayne-Jones was chosen unanimously for reappointment by his colleagues on the board of permanent officers of the medical school, by the president and by the corporation of the university. He graduated at Yale in 1910 and from Johns Hopkins University School of Medicine in 1914. He joined the Yale faculty in 1932. He has served as professor of bacteriology, University of Rochester School of Medicine, Rochester, N. Y., and director of the Rochester Health Bureau Laboratories, among other activities. He was chairman of the division of medical sciences, National Research Council, 1932-1933; member of the Council on Pharmacy and Chemistry of the American Medical Association, 1930-1934, president of the Society of American Bacteriologists, 1929-1930, and of the American Association of Immunologists, 1930-1931.

DISTRICT OF COLUMBIA

Life Membership in District Society.—Eight members of the Medical Society of the District of Columbia were recently elevated to life membership. The eight physicians are Drs. Thomas Dowling, Wilmington, Del.; Thomas A. Groover, Robert S. Lamb, Carl S. Keyser, Frederick H. Morhart, Charles S. White, Harry Hurtt and Henry A. Polkinhorn. To receive this honor it is necessary to be an active member of the society for forty years.

Society News. — The Medical Society of the District of Columbia was addressed, February 28, by Drs. George W. Thorn, Baltimore, on "Clinical Considerations Regarding the Use of Desoxycorticosterone Acetate Therapy in Addison's Disease" and Alva D. Daughton, "Simmond's Disease: Presentation of a Proved Case with Consideration of a Differential Diagnosis." The section on gastro-enterology presented a symposium and panel discussion on peptic ulcer before the society, February 14; the speakers were Drs. Ernest H. Gaither, Baltimore, on "Comparative Analysis of the Results of Various Forms of Medical Management of Peptic Ulcer" and George P. Müller, Philadelphia, "End Results and the Surgical Approach to Peptic Ulcer."——Dr. Francis C. Wood, Philadelphia, discussed "Coronary Diseases" before the naval medical and dental officers on duty in the District of Columbia and vicinity at the U. S. Naval Medical School, Washington, February 5.

ILLINOIS

Postgraduate Conference.—The third of a series of postgraduate conferences sponsored by the Illinois State Medical Society will be held at DuQuoin, March 7. Dr. Gilbert H. Edwards, Pinckneyville, president of the Perry County Medical Society, will preside. The speakers will include:

Dr. Andy Hall Jr., St. Louis, Urinary Tract Infections.
Dr. Clinton W. Lane, St. Louis, Diagnosis and Treatment of the Common Skin Diseases.
Dr. Joseph C. Jaudon, St. Louis, Problems of the Newborn.
Dr. Robert S. Berghoff, Chicago, heart clinic (four patients).
Dr. Frederick H. Falls, Chicago, Management of Abortion.
Dr. Francis J. Dean Sauer, St. Louis, Hand Infections, Diagnosis and Treatment.
Dr. Philip H. Kreuscher, Chicago, Fracture Problems.
Dr. Charles W. Mayo, Rochester, Minn., Preoperative and Postoperative Care of the Surgical Case.
Dr. James H. Hutton, Chicago, Diagnosis of Endocrine Disorders.
Dr. Edwin S. Hamilton, Kankakee, Voluntary Health Insurance in Illinois.

Chicago

Public Meeting on Cancer—Plummer Memorial Lecture.—The Henry Schmitz Memorial Lecture will be delivered by Dr. Francis Carter Wood at a public meeting, March 6, sponsored by the cancer research committee of the Chicago Woman's Club and the Chicago Medical Society. Dr. Wood will discuss cancer. The meeting will be held at the woman's club following an all day clinical session. At 6:30 the Chicago Medical Society will hold a reception and dinner in honor of Dr. Wood, who is director of the Institute of Cancer Research at Columbia University College of Physicians and Surgeons, New York. Dr. James Randolph Webster, clinical instructor in dermatology, Rush Medical College, will deliver the Mary Redfield Plummer Memorial Lecture, March 7, at the woman's club on "Primary Cancer of the Skin."

Selection of Pioneer Physicians.—In an address at the Rosenwald Museum of Science and Industry, January 9, Dr. William Allen Pusey, Chicago, a former President of the American Medical Association, gave his choice of the chief leaders of Chicago's early medical history. They include:

Daniel Brainard, 1835 to 1866.
John Evans, 1845 to 1858.
Nathan S. Davis, 1849 to 1904.
John H. Rauch, 1857 to 1894.
Christian Fenger, 1878 to 1902.
Frank Billings, 1881 to 1932.
Ludvig Hektoen, 1887 to the present.

The lecture, entitled "High Lights in the History of Chicago Medicine" was presented under the auspices of the Chicago Historical Society, the Society of Medical History of Chicago and the Institute of Medicine of Chicago. Following the lecture a reception was held in honor of Dr. and Mrs. Pusey and a tour made to see the medical exhibits at the museum which are being transferred into new quarters.

Branch Meetings.—The Evanston Branch of the Chicago Medical Society was addressed by Dr. Burton C. Corbus Jr., February 1, on "Clinical Evaluation of Testosterone Propionate"; Drs. Richard H. Young and Robert P. Gilbert, "Use of Aminophylline for Control of Bronchial Spasm," and Dr. Seth E. Brown, "Use of a Hospital Blood Bank." A symposium on peripheral vascular disease was presented before the North Shore Branch, February 6, by Drs. Louis G. Herrmann, Cincinnati, Frank V. Theis and Samuel Perlow. The branch will be addressed, March 5, by Drs. Russell L. Hayden, Cleveland, on "Some Aspects of Polycythemia of General Interest" and Charles A. Doan, Columbus, "The Reticulo-Endothelial System." The North Side Branch was addressed, February 1, by Drs. Ray F. Farquharson, Toronto, on "Hypopituitarism with Special Reference to Simmond's Disease" and Edward H. Rynearson, Rochester, Minn., "A Skeptic Looks at Endocrinology." Dr. C. Sidney Burwell, Boston, will address this branch and the Chicago Medical Society, March 7, at the Drake Hotel on "The Effect of Pregnancy on the Management of Heart Disease." Dr. W. Wayne Babcock, Philadelphia, will discuss "Diagnosis and Management of Inflammatory and Neoplastic Growths of the Colon" before the Englewood Branch, March 5.

LOUISIANA

Personal.—Dr. John H. Musser, New Orleans, received the Alumni Award of Merit of the University of Pennsylvania School of Medicine, Philadelphia, on Founder's Day, January 17, as part of the observance of the bicentennial of the university. Dr. Musser graduated in 1908.

Society News.—A symposium on pneumonia was presented before the Orleans Parish Medical Society, January 22, by Drs. Andrew V. Friedrichs, Stanford Chaille Jamison, Meyer D. Teitelbaum and Joseph O. Weilbaecher Jr.——Dr. Daniel N. Silverman, New Orleans, addressed the East Baton Rouge Medical Society recently on "Carcinoma of the Stomach."——A symposium on cutaneous diseases was presented before the Jefferson Davis Parish Medical Society at Jennings recently by Drs. James K. Howles, James W. Tedder and Charles Barrett Kennedy.

District Meetings.—The Fifth District Medical Society was addressed in Monroe recently among others by Drs. John B. Elliott, New Orleans, on "Memoirs of Forty-Five Years' Practice of Internal Medicine"; Edward N. Cook, Rochester, Minn., "Transurethral Prostatic Resection," and Henry Ashton Thomas, New Orleans, "Rhinologic and Otologic Problems of the General Practitioner."——At a meeting of the Third District Medical Society in New Iberia recently the speakers included Drs. Charles S. Holbrook and Leon J. Menville, New Orleans, on "Differentiating Depressive Reactions from Somatic Diseases" and "Present Day Methods of Diagnosing Tumors of the Breast" respectively.

MASSACHUSETTS

Society News.—The Boston Tuberculosis Association, the Southern Middlesex Health Association and the Trudeau Society of Boston held a joint meeting in Boston, January 25; following the business meetings of the tuberculosis and health associations Dr. Edward G. Huber spoke on "Tuberculosis as a Future Public Health Problem." In the evening Dr. Chevalier L. Jackson, Philadelphia, addressed the Trudeau Society of Boston on "Bronchoscopy in the Diagnosis and Treatment of Thoracic Disease."——Among others, Drs. John P. Hubbard and Robert E. Gross, Boston, addressed the Suffolk District Medical Society, January 31, on "Criteria for Ligation of the Patent Ductus Arteriosus in the Light of the First One and a Half Years' Experience."——Dr. Harry Linenthal, Boston, addressed the New England Heart Association, January 29, among others, on "Clinical and Pharmacologic Observations in Paroxysmal Ventricular Tachycardia."——The New England Society of Physical Medicine was addressed, January 24, by Mr. A. Philip Mooradian, New York, on "Comparative Physics of Long-Wave and Short-Wave Diathermy Generators."

MICHIGAN

The Henry Russel Lectureship.—Dr. Frank N. Wilson, professor of internal medicine, University of Michigan Medical School, Ann Arbor, was awarded the Henry Russel Lectureship in December. The lectureship is considered the highest university award and was established by the late Henry Russel, Detroit, a member of the class of 1873. Dr. Wilson will deliver the lecture at the university on May 2. The tentative title of his lecture is "The Electrical Currents Produced by the Human Heart."

Personal.—Dr. Roy H. Holmes, Muskegon, was elected editor of the state medical journal at a meeting of the council of the Michigan State Medical Society in January. He succeeds Dr. James H. Dempster, who resigned in December after serving in the position for twelve years. Dr. Dempster was presented recently with a scroll in recognition of his long service to the society.——Dr. Richard H. Lyons, Ann Arbor, has been appointed medical director of the Dr. William J. Seymour Hospital, the medical unit of Eloise Hospital and Infirmary, Eloise.

New Ophthalmologic Society.—The Detroit Ophthalmological Society was organized at a meeting in the headquarters of the Wayne County Medical Society, Detroit, January 30. There will be five classes of membership: active, associate, honorary, life and special members. The officers elected are Drs. Parker Heath, professor of ophthalmology, Wayne University College of Medicine, president; Ralph H. Pino, president-elect; Leland F. Carter, secretary; Cecil W. Lepard, treasurer; Edmond L. Cooper, recorder. Honorary presidents are Drs. Don M. Campbell and Walter R. Parker. Dr. Campbell served as professor of ophthalmology at Wayne for more than forty years and Dr. Parker for twenty-eight at the University of Michigan Medical School, Ann Arbor.

MINNESOTA

Special Course in Pathology.—A course entitled "Surgical Pathology with Special Attention to Tumors" will be offered at the University of Minnesota Medical School, June 19-July 26. It is the same course presented by the university last summer by Dr. James S. McCartney, associate professor of pathology.

Society News.—The Hennepin County Medical Society was addressed in Minneapolis, February 21, by Drs. Joseph C. Michael and Nathaniel J. Berkwitz on "Pharmacologic Shock Therapy" and "Faradic Shock Treatment in Functional Psychoses" respectively.——Dr. Sumner L. S. Koch, Chicago, addressed the eighteenth annual dinner of the Minneapolis Surgical Society in Minneapolis, February 1, on "Transplantation of Skin and Subcutaneous Tissue to the Hand." Dr. Koch was presented with a certificate of honorary membership following his lecture.——Dr. Carl J. Wiggers, professor of physiology, Western Reserve University School of Medicine, Cleveland, gave a Mayo Foundation lecture, February 8, on "Ventricular Fibrillation."

MISSISSIPPI

Regional Meeting on Pediatrics.—The annual meeting of region II of the American Academy of Pediatrics will be held at the Edgewater Gulf Hotel, Edgewater Park, March 15-16. Region II of the academy comprises the southern states from Virginia to Texas.

Birmingham Physicians Give Program.—The following program was presented by Birmingham physicians before the Central Medical Society of Mississippi at Jackson recently:

Dr. Ellis Dice Lineberry, A Consideration of the Individual Along with His Disease—Three Case Reports.
Dr. James S. McLester, The Commoner Forms of Nutritive Deficiency.
Dr. Thomas M. Boulware, Hydatidiform Mole.
Dr. Paul W. Shannon, Compound Fractures.
Dr. Wallace A. Clyde, Clinical Experience in the Treatment of Meningitis.
Dr. Louis C. Posey, Pathology of the Endometrium.
Dr. John L. Carmichael, Breast Tumors.

NEBRASKA

Personal.—Dr. Arthur C. Stokes has retired after more than thirty years as medical director of the Guarantee Mutual Life Insurance Company of Omaha. Dr. James P. Donelan, formerly of Los Angeles, is his successor.——Drs. Joseph E. Dunn and Frank A. Burnham, Arnold, were honored at a public meeting on January 18. The two physicians were presented with quilts on which were embroidered the names of several hundred persons at whose births they had officiated.

Society News.—Drs. Herschel B. Morton and E. Burkett Reed, Lincoln, addressed the Madison Six County Medical Society in Norfolk, January 16, on "Diagnosis and Treatment of Intestinal Obstruction: with Special Emphasis on the Miller-Abbott Tube" and "Iron Deficiency Anemias" respectively.——Speakers at a meeting of the Fifth Councilor District in Columbus, January 9, were Drs. Arthur L. Miller, Kimball, president of the Nebraska State Medical Association, "The Physician's Public Relationship"; Wayne M. Hull, Oklahoma City, "Inhalation Therapy," and Frederick W. Niehaus, Omaha, "Rheumatic Heart Disease."

NEW YORK

Society News.—Dr. David Wolin, Rochester, addressed the Rochester Pathological Society, January 9, on "Clinical Aspects of Blood Diseases in Children."——The Medical Society of the County of Monroe, the Rochester Academy of Medicine and the University of Rochester School of Medicine sponsored a public meeting, January 28, with John R. Murlin, Ph.D., professor of physiology at the university, as the speaker on "The Place of Vitamins in Normal Nutrition."—— Drs. Daniel B. Peeler and John A. Lichty Jr., addressed the Rochester Pediatric Society, January 12, on "Hypoglycemia" and "Recent Studies of Nephritis" respectively.

New York City

Science Writer Honored.—William L. Laurence, science news reporter of the New York *Times*, received the 1940 fellowship of the American Institute of the City of New York at a dinner at the Hotel Pierre February 1. Mr. Laurence was presented for the award by Oscar Riddle, Ph.D., of the research staff of the Carnegie Institution for Experimental Evolution, Cold Spring Harbor, L. I. His citation was "for a long-sustained pre-eminent record of reporting brilliantly to the daily press the achievements of science and technology."

Meeting on Tuberculosis and Heart Disease. — The thirty-eighth annual meeting of the New York Tuberculosis and Health Association, including the Tuberculosis Sanatorium Conference of New York and the New York Heart Association, will be held at the Hotel Pennsylvania March 5. Among the speakers will be:

Drs. James Burns Amberson Jr. and Carl Muschenheim, Detecting and Controlling Tuberculosis Among Hospital Personnel.
Dr. Herbert R. Edwards and Mr. Matthew Woll, third vice president, American Federation of Labor, The Labor Unions in Tuberculosis Control.
Dr. Henry D. Chadwick, Boston, The Tuberculosis Program in These Changing Times.
Dr. Homer F. Swift, Public Health Aspects of Rheumatic Disease.

A symposium on rheumatic fever will be presented by Drs. Thomas Duckett Jones, Boston; John R. Paul, New Haven, Conn., and Miss Edith Terry of the Massachusetts General Hospital, Boston.

Society News.—Dr. Harold G. Wolff will give the Friday afternoon lecture at the New York Academy of Medicine, March 8, on "Medical Treatment of Pain" instead of Dr. Walter L. Niles, as originally announced.——Drs. Terry M. Townsend, president of the Medical Society of the State of New York, and Richard B. Cattell, Boston, addressed the Medical Society of the County of Kings, Brooklyn, February 20, on "Who Shall Lead the Leaders?" and "Surgical Management of Diseases of the Biliary Tract," respectively. This society is presenting courses in contemporary medicine on Monday afternoons from March 4 to May 13. Subjects are allergy, tuberculosis, nontuberculous pulmonary disease, hematology, metabolism and nutrition.—— Drs. Harry S. Gradle, Chicago, and Alfred Cowan, Philadelphia, addressed the Brooklyn Ophthalmological Society, February 15, on "Glaucoma Capsulare" and "Correction of Refractive Errors in Children" respectively.——Dr. Herbert S. Gasser was elected president of the Harvey Society at the annual meeting, January 26; Homer W. Smith, Sc.D., vice president, and Dr. Thomas Francis Jr., secretary, reelected.—— Dr. Jacob M. Gershberg was recently reelected president of the International Spanish-Speaking Association of Physicians, Dentists and Pharmacists and Dr. James W. Babcock II, secretary.——Drs. George C. Adie, New Rochelle, and Cameron Haight, Ann Arbor, Mich., addressed the New York Society for Thoracic Surgery, February 9, on "Observations on Thoracoplasty for Treatment of Pulmonary Tuberculosis" and "Extrapleural Pneumothorax" respectively.——At a meeting of the American Society of Anesthetists, February 14, the speakers were Dr. Ralph M. Waters, Madison, Wis., on "Pain Relief in Obstetrics" and Detlev W. Bronk, Ph.D., Philadelphia, "The Influence of Anesthetics on the Activity of Nerve Cells."

OREGON

Society News.—Dr. Donald M. Long, Marshfield, addressed the Coos-Curry Counties Medical Society, Marshfield, January 10, on "Perforated Gastric Ulcers."——Drs. Moses E. Steinberg and Isidor C. Brill addressed the Multnomah County Medical Society, Portland, February 7, on "Problems in Gastric Surgery" and "Circulatory Failure with Special Reference to Digitalis" respectively.

Spring Course in Ophthalmology and Otolaryngology. — Drs. Meyer Wiener, professor of clinical ophthalmology, Washington University School of Medicine, St. Louis, and Marvin F. Jones, formerly professor of otolaryngology, New York Post-Graduate Medical School, will be the guest speakers at the fifth annual spring postgraduate course of the Oregon Academy of Ophthalmology and Otolaryngology. The course will be given in cooperation with the University of Oregon Medical School in Portland, April 1-6.

PENNSYLVANIA

Hospital Changes.—Dr. Thomas I. Cotton has resigned as superintendent of Selinsgrove State Colony for Epileptics, Selinsgrove. Dr. Ronald B. McIntosh, formerly on the staff of Norristown State Hospital, Norristown, is his successor.

Search for Meningitis Carriers.—Seven carriers of the organism of spinal meningitis have been found in and near Wilkes-Barre in Luzerne County, where forty-seven deaths from the disease have occurred since last September, according to newspaper reports. Plans were being made to examine 2,500 employees of a coal company in the area after it appeared that most of the cases occurred in families associated with mining.

Society News.—Dr. John P. Henry, Pittsburgh, addressed the Cambria County Medical Society, Johnstown, February 8, on "Diseases of the Peripheral Arteries and Veins."——Drs. Michael Fresoli and Harry A. Rothrock Jr., Bethlehem, addressed the Northampton County Medical Society, February 16, at the Northampton Country Club on "Present Day Treatment of Pneumonia" and "The Laboratory in Pneumonia" respectively.——Dr. Barton R. Young, Philadelphia, addressed the Lebanon County Medical Society, Lebanon, February 13, on "Roentgenology and the General Practitioner."——Dr. Joseph M. Shelton, Washington, addressed the Washington County Medical Society, Washington, February 14, on common diseases of the skin.

Philadelphia

Temple Alumni Meeting.—The Midwinter Alumni Day of the Medical Alumni Association of Temple University was held, February 29, with a program at the university hospital and the medical school during the day and dinner at the Hotel Warwick in the evening. Dr. Frank H. Lahey, Boston, was the guest speaker, presenting addresses on "Management of Thyroid Disease" and "Some of the Newer Developments in Surgery."

Joint Surgical Meeting.—The annual joint meeting of the New York Surgical Society and the Philadelphia Academy of Surgery was held in Philadelphia, February 14, with the following speakers: Drs. Eldridge L. Eliason and Julian Johnson on "Acute Regional Enteritis"; Hubley R. Owen, John Paul North and Lewis C. Manges Jr., "Fractures of the Shaft of the Humerus," and Thomas A. Shallow, "The Operative Technic of Pulsion Pharyngeal Diverticulum and Traction Diverticulum of the Esophagus." Drs. Richard H. Meade Jr., Joshua Montgomery Deaver, Gilson C. Engel and Hans May presented case reports.

Personal.—Dr. Thomas S. Dunning, aged 92, was honored by the Dickinson Club of Philadelphia, January 10, as the oldest living alumnus of Dickinson College. He was graduated in 1867.—— Dr. John Claxton Gittings received the degree of bachelor of arts from the University of Pennsylvania, February 17, as a member of the class of 1894, by a special request of that class addressed to the president of the university. It was said that when Dr. Gittings was a sophomore he was compelled to drop out of the university because of his eyes. Instead of completing his academic work he went directly to medical school, graduating in 1895.

Lectures on Genetics.—The Woman's Medical College of Pennsylvania is presenting a series of lectures on "Medical Genetics," made possible by a gift from an alumna of the class of 1889. Charles B. Davenport, Ph.D., of the Carnegie Institution laboratory at Cold Spring Harbor, N. Y., delivered the first lecture, February 26, on "Human Variability and Mate Selection." Dr. Davenport will give the second, March 4, on "Some Social Applications in Eugenics." On March 11 there will be four speakers at an afternoon meeting:

Dr. Davenport, Heredity in Relation to Medicine.
Clyde E. Keeler, Sc.D., Boston, The Value of Animal Experiments to the Understanding of Human Genetics.
Maud Slye, Sc.D., Chicago, Genetics and Cancer.
Dr. Madge Thurlow Macklin, London, Ont., The Value of Medical Genetics to the Clinician.

Pittsburgh

Society News. — Speakers before the Allegheny County Medical Society, February 20, were Drs. James Everett McClenahan on "Intestinal Intubation; Its Application in Intestinal Obstructions"; Sidney A. Rosenberg, "Results in Reconstructive Surgery," and Daniel P. Greenlee, "Malignancy of the Gallbladder." Dr. Floyd H. Bragdon presented a motion picture on "Surgical Treatment of Paroxysmal Convulsive Disorders."——Drs. John Huber Wagner and Stuart N. Rowe addressed the Pittsburgh Surgical Society, February 6, on "Periarticular Adhesions of the Shoulder Joint with Treatment by Manipulation" and "Osteomyelitis" respectively. —— Dr. Maud L. Menten, among others, addressed the Pittsburgh Pediatric Society, February 9, on "Childhood Anemias Associated with Erythroblastosis."——At a meeting of the Pittsburgh Urological Association, February 12, the speakers were Drs. Stacy M. Hankey, Pittsburgh, and Louis Bernstein, Aspinwall, on "Conservative Treatment of Hydronephrosis" and Clifford M. Lane on "Polycystic Disease of the Kidney."—— Dr. Richard B. Cattell, Boston, gave the R. W. Stewart Memorial Lecture of the Pittsburgh Academy of Medicine, February 13, on "Carcinoma of the Rectum."

GENERAL

Grants for Research in Sex.—Applications to the National Research Council for funds to support study of fundamental problems of sex and reproduction should be received before April 1, according to a notice in *Science*. They may be addressed to the chairman of the committee for research in problems of sex, Robert M. Yerkes, Sc.D., Yale University School of Medicine, New Haven, Conn. Preference will be given to proposals for the investigation of neurologic, psychobiologic and behavior problems.

All Expense Tour to Federation Meeting.—Dr. Arno B. Luckhardt, professor of physiology, University of Chicago, is sponsoring an all expense tour for persons attending the annual meeting of the Federation of American Societies for Experimental Biology, New Orleans, March 13-16. The tour will leave Chicago Monday morning March 11 and arrive in New Orleans Tuesday morning March 12. Information may be obtained from Dr. Luckhardt, Department of Physiology, University of Chicago, Chicago.

Delegates to the Pharmacopeial Convention. — All medical schools and medical societies who expect to send delegates to the U. S. Pharmacopeial Convention to be held in Washington, D. C., May 14-16, should send the credentials to the board of trustees of the U. S. Pharmacopeia before March 15. If the blank forms have been misplaced, duplicate copies may be obtained by addressing E. Fullerton Cook, Philadelphia College of Pharmacy and Science, Philadelphia, chairman of the Revision Committee of the U. S. Pharmacopeia.

Impostor Victimizes Physicians.—The California State Board of Medical Examiners reports that an impostor has been victimizing professional and business men by fraudulent checks drawn on the Crawford County Trust Company, Meadville, Pa. He usually approaches his victims by announcing that he proposes to open an office as a physician specializing in surgery. The man is said to be about 38 years old and 5 feet 6 or 7 inches tall. He weighs from 135 to 140 pounds, has brown eyes, is partly bald and wears horn-rimmed glasses. He wears a small moustache and acts nervous, it is said. Names he has used are "Dr." Marven Gordon Dietz, "Dr." Morgen Brooks and "Dr." Morris.

Society News.—Dr. Paul R. Cannon, Chicago, was elected chairman of the section on medical sciences (N) and a vice president of the American Association for the Advancement of Science at the recent meeting in Columbus.——Dr. Arthur E. Strauss, St. Louis, was installed as grand consul of Phi Delta Epsilon medical fraternity at the annual meeting in New York, December 30, succeeding Dr. Morris Fishbein, Chicago, Editor of THE JOURNAL. Dr. Israel S. Zinberg, Baltimore, was elected grand consul-elect; Dr. Leo H. Criep, Pittsburgh, vice consul, and Dr. Benjamin Edgar Spiegel, New York, grand scribe. —— Dr. William W. Wasson, Denver, was named president-elect of the Radiological Society of North America at its annual meeting in Atlanta, Ga., in December. Dr. Bernard H. Nichols, Cleveland, was installed as president. Vice presidents elected were Drs. Robert R. Newell, San Francisco; Rabun T. Wilson, Austin, Texas, and Leo G. Rigler, Minneapolis. Dr. Donald S. Childs, Syracuse, was reelected secretary. —— The Women's Field Army of the American Society for the Control of Cancer held its second national assembly in Louisville, Ky., February 14-16.——Dr. Ruth E. Boynton, Minneapolis, was elected president of the American Student Health Association at its recent annual meeting in New York. Dr. Fred N. Miller, Eugene, Ore., was elected vice president and Dr. Ralph I. Canuteson, Lawrence, Kan., secretary.

The Sixteenth Decennial Census. — The Bureau of the Census announces that the sixteenth decennial population census of the United States will be conducted in April by 120,000 enumerators. A force of 7,000 statisticians and clerks under the supervision of the bureau's permanent staff will tabulate the figures, making the results available in a short time, it is expected. This year's census will include questions designed to provide illuminating data on problems that have become particularly pressing in the last decade. New statistical knowledge will be developed on education, mass migration, employment, unemployment, occupation and income. There are thirty-three questions on the general population schedule. Of these the average person will have to answer not more than half, according to the announcement. Twenty of these are general questions relating to location, household data (number in family and kind of home), name, relationships, personal description, education, place of birth, citizenship and place of residence five years ago. This last question is designed to measure internal migration, such as movements from the dust bowl areas. The last thirteen questions in the general list concern employment and will be addressed to all persons over 14 years of age. A special group of questions will be asked of one in every twenty persons enumerated to provide the Census Bureau with a statistical sample to fill requests for informations on special subjects. These questions are on the following subjects: place of birth of mother and father, mother tongue, veterans of military service, social security status, usual occupation (this is designed to determine how many persons are working outside their usual occupations) and women who are or have been married. Separate censuses are being made of business, manufactures and mines and quarries. These have been under way since January. Concurrent with the population census in April will be the censuses of housing, agriculture and irrigation and drainage.

Red Cross to Enroll Medical Technologists.—At the request of the surgeon general of the U. S. Army and in compliance with its policy of cooperation with the army and navy, the American Red Cross has undertaken the enrolment of various types of medical technologists who are willing to serve in the medical department of the army and navy if and when their services are required at the time of a national emergency. Persons with the following qualifications will be enrolled:

Chemical laboratory technicians (male).
Dental hygienists (male and female).
Dental mechanics (male).
Dietitians (male and female).
Laboratory technicians (male and female).
Meat and dairy hygienists (inspectors) (male).
Nurses (male).
Occupational therapy aides (male and female).
Orthopedic mechanics (male).
Pharmacists (male and female).
Physical therapy technicians (aides) (male and female).
Statistical clerks (male and female).
X-ray technicians (male and female).

Male nurses will not be members of the army or navy nurse corps, which under basic laws are limited to women, but will be used as technologists for service auxiliary to the regular corps. Male technologists will be eligible for enlistment in the army as noncommissioned officers in the grades of sergeant, staff sergeant or technical sergeant. Women technologists and men who do not qualify physically will be eligible for employment by the army as civilians. For the navy, male technologists will be eligible for enlistment in the naval reserve as petty officers—pharmacist's mates third, second and first class and chief pharmacist's mate (acting appointment). Women are not eligible for service in the navy, according to present plans. General qualifications for enrolment are as follows: citizens of the United States; ages 21-45 for the army and 18 to 35 (men only) for the navy; physically qualified; women must be unmarried; all must express willingness to serve as technologists in time of a national emergency. The medical department of the army will require a considerable number of technologists in all groups; the navy's requirements will be similar except that dietitians, occupational therapy aides, orthopedic mechanics and dairy and food hygienists (inspectors) will not be needed. The navy also desires peace time enlistment in the U. S. Naval Reserve, and male technologists who wish to enlist are urged to communicate directly with the commandant of the naval district in which they live. Technologists who qualify for this service and are willing to enroll should communicate with the American National Red Cross, Washington, D. C.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Jan. 26, 1940.

Ambulances for Finland

The admiration and sympathy for the Finns in their heroic stand against aggresion is manifested in a practical form. We are doing what we can while engaged in a struggle of the same kind. A voluntary ambulance unit of the Women's Transport Service for work with the Finnish Red Cross is being sent. It consists of ten ambulances presented by the Canadian Red Cross, the British Red Cross and the officers of the Women's Transport Service. They are modeled on the lines of the British War Office type on a 24 horsepower eight cylinder Ford chassis and are internally heated. There is antifreeze mixture in the radiators, and a special paraffin burner is carried under the bonnet. The unit was inspected by the princess Alice in the presence of the Finnish minister and other foreign ministers and by the high commissioners for Canada and other dominions. The Finnish minister said that they would be an encouragement to the Finns in their struggle against tremendous odds. Care has been taken to equip the women of the unit against the rigors of the Finnish winter. They are equipped with men's woolen underclothing, of which they will wear two sets at a time. A second pair of heavy wool socks will be worn over the ski trousers.

Increase of Road Accidents Due to the Black Out

An increase of road accidents due to the darkness of the black out has been previously described. The number of deaths from this cause in December was 1,155, the highest in any month since records have been kept and an increase of 212 over December 1938. The highest previous record for one month was in September, the first month of the war, when 1,130 persons were killed. In October the figure fell to 919 and in November it was 926. The December 1939 figure included 820 pedestrians, the great majority of whom were killed during the black out. On very dark nights it is not uncommon for seven cases of fracture due to the black out to be brought into one London hospital. During the whole of 1939 the road deaths totaled 8,270 as compared with 6,599 in 1938. Of last year's total 849 were pedestrians under 15 years of age; 3,644 were pedestrians over 15; 1,064 were motorcyclists and 1,374 were pedal cyclists.

The National Safety First Association in an appeal for greater care on the roads emphasizes that the road deaths are now increasing at the rate of nearly 5,000 a year. Unnecessary use of the road at night should be avoided. Pedestrians who must be out should remember that their invisibility makes the danger and should protect themselves by wearing or carrying something white or luminous. So far the first four months of the war has increased the road deaths by 1,639 (66 per cent).

Improvement in the Health of Children

Sir Arthur Salusbury MacNalty, chief medical officer to the Board of Education, in his annual report said that for more than thirty years the school medical service has been actively promoting the health and welfare of school children. While we are far from perfection, school children of today in general health, physique and stature are much better than they were at the beginning of this period. During the year the nutrition of 1,674,023 children was assessed in routine medical inspection. In 14.5 per cent it was excellent, in 74.2 per cent normal, in 10.8 per cent slightly subnormal and in only 0.5 per cent bad. In many cases the local school authorities supply free meals or milk. The number of children receiving either of these was 687,855 in 1938-1939. In March 1939 the milk in schools scheme was in operation in 86.9 per cent of all the departments of public elementary schools. The schools not operating it were mainly small rural ones containing less than 5 per cent of the children; 55.6 per cent of the children were taking milk under the scheme either free or on payment. On the advice of Professor Drummond some necessitous children were fed by the Oslo method and compared with others fed on the usual hot two course dinners. The "Oslo meal" consisted of salad (lettuce or, in winter, raw cabbage), tomatoes, cucumber, salad dressing, 1½ ounces of cheese, 3 ounces of brown bread, one-fourth ounce of butter, two thirds of a pint of milk and a raw apple or orange. The vegetables were made into a salad, and grated cheese was served on top. The children so fed showed a considerable advantage compared with controls. Many had not eaten brown bread before. The meal takes at least half as long again to consume as the two course hot dinner, as there is so much hard food to masticate.

COPENHAGEN

(From a Special Correspondent)

Jan. 16, 1940.

Preparations for Blood Transfusion in Wartime

With war looming near, the central committee of the Danish Medical Association has urged the nation to rally to the Danish Red Cross to help it realize its scheme for blood typing. Danish doctors have undertaken to make no charge for the taking of samples of blood for type determinations, and men and women exempt from military duties and between the ages of 18 and 60 have been urged to report to the nearest branch of the Danish Red Cross for information concerning blood donation. The State Serum Institute in Copenhagen has undertaken the necessary type determinations, a tremendous task.

The response to the appeal for donors for a wartime emergency has been so generous that in a short time over 29,000 persons answered it, and nearly 27,000 have passed the necessary tests and have been registered both at the headquarters of the Danish Red Cross and with the local branches to which they belong. In one district, Lolland, a special study has been made of the relative numbers of the different blood types. It was found that 38.7 per cent belonged to type O, 47.3 per cent to type A, 9.8 per cent to type B and only 4.2 per cent to type AB. The Danish army medical service is well satisfied with this ample reserve of donors, who, it is understood, will not be called on to shed their blood in any but a wartime emergency. For the emergencies of peace other arrangements are already in force.

The headquarters of the Danish Red Cross has been urged to devise a system for keeping the registers, central and local, constantly down to date, with special reference to the changes of the addresses of donors. In a recent issue of the *Ugeskrift for læger,* Dr. Erik Brammer pointed out how advantageous it might be for the prospective recipients of transfused blood if the rule was made of typing the blood of all persons whose blood is examined for some other purpose. In the course of time much valuable information would be obtained with regard to not only the donors but also the recipients of transfused blood.

The Declining Syphilis Rate

The decline of syphilis in Denmark is so marked from year to year that one might be tempted to anticipate its complete extinction in our own time but for the import of new infections from abroad. In 1930 there were 1,678 notifications of new cases of acquired syphilis (as distinct from congenital syphilis, of which 116 new cases were notified in this year); in 1938, only 470 new cases of acquired syphilis were notified, the number of new cases of congenital syphilis notified being down to fifty in this year. Between 1930 and 1938 the ratio of new cases of acquired syphilis per 10,000 inhabitants has dwindled from 4.7 to 1.2. These most encouraging figures must, however,

be taken with due reserve. For it is often a ticklish matter to notify a case of venereal disease, and when one is in doubt it is easy to forget. It is therefore just as well that the efficacy of notification can be controlled from time to time by another system: the records of Wassermann reactions at the State Serum Institute, in which the Wassermann testing is centralized for the whole of Denmark. Dr. P. Krag and Dr. Marie Lindhardt have compared these two sources of information in a laborious study, which shows how defective the notifications of new cases of syphilis are likely to be, especially in a large city such as Copenhagen. Yet there can be no doubt as to the reality of the decline in the frequency of syphilis in the recent past.

Alcohol and Traffic Accidents

What most impresses the foreign visitor to Copenhagen is the prodigious number of its bicycles. In the busy hours of the day they are so thick on the pavement that crossing the street seems a physical impossibility. In 1937 Copenhagen could boast only 27,711 motorcars and only 6,752 motorcycles, whereas its bicycles number some 400,000. Little wonder therefore that bicycles and bicyclists figure prominently in traffic accidents. At the University Medico-Legal Institute, which is under Prof. Knud Sand, the calculation has recently been made that 45 per cent of all the deaths from traffic accidents between the ages of 11 and 60 in the period from 1926 to 1937 concerned bicyclists. The common assumption that in clashes between motorists and bicyclists the motorist is the aggressor is not always fair to him, and when attempts are made to apportion blame by means of blood and urine tests for alcohol, the testing ought to be extended to the bicyclist and even to the pedestrian involved in a fatal accident. This principle was put into force by the Copenhagen police between two and three years ago, the public hospitals being instructed to undertake alcohol tests of the blood and urine of all patients admitted for traffic accidents. Professor Sand and Dr. P. H. Andresen have found an alcoholic concentration of more than 0.1 per cent in the blood of 44 per cent of the 174 persons injured in traffic accidents during 1937 and up to August 1938. These persons were between the ages of 15 and 60. It does not say much for the sobriety of the average Dane in Copenhagen that almost every other person involved in some traffic accident has such a disconcertingly high concentration of alcohol in his blood.

SWITZERLAND

(From Our Regular Correspondent)

Dec. 26, 1939.

New School of Psychotherapy in Zurich

Under the direction of a board of trustees of psychiatrists and neurologists and at the suggestion of the Psychotherapeutic Commission of the Swiss Society of Psychiatry, a school of psychotherapy has been founded in Zurich. It means to give an opportunity for a thorough education especially to physicians and to induct practicing physicians into the scientific problems involved. The phenomena of psychoneurosis will be taught by means of lectures and practical demonstrations. The connection between the special problems of psychologic research and the verified facts of medicine and biology is to be maintained. The membership of the board consists, in part, of Dr. Binswanger, Dr. Forel, Prof. C. G. Jung and Dr. Hans W. Maier, professor of psychiatry, of Zurich.

Congress of Psychiatrists and Neurologists

The Swiss neurologic society and the society of Swiss psychiatrists held a joint meeting in Lugano under the presidency of Prof. John Staehelin, of Basel. The main subject of discussion was neuropathology and psychopathology of occupational poisoning on which Professors Flury, of Würzburg, Hans W. Maier, of Zurich, and H. Steck, of Lausanne, read papers. Dr. Lüthy, of Zurich, discussed peripheral nervous lesions in occupational poisoning.

Hereditary Feeblemindedness in Switzerland

In Switzerland, as in other countries, the fertility of the normal population is surpassed by that of families with hereditary feeblemindedness. Investigations in the city of Winterthur found that the families from which children came that attended special classes for backward pupils were larger than those of normal children (on the average 3.3) while the normal family groups had fallen to an average of 2.1 and 2.5, respectively. Dr. Brugger, school physician in Basel, genealogically examined the children of parents of 1,396 normal pupils and those of 427 hereditarily feebleminded pupils and published his observations in a book on "Hereditary Diseases and Their Control." The investigation plainly shows that for several decades and at all economic levels, in Basel as well as elsewhere, on the average the families in which hereditary feeblemindedness was found were larger than those of the normal group. This difference in fecundity, he said, must slowly but progressively lead to an increase of the feebleminded unless the necessary eugenic control measures are promptly taken.

European Commission for Mental Hygiene

The European Commission for Mental Hygiene held its sixth meeting at the same time, and Switzerland, Belgium, Estonia, France, Germany, Great Britain, Italy, the Netherlands, Poland, Rumania, Sweden, Switzerland, Turkey and Yugoslavia were represented. The sessions were devoted to phases of the problem of mutual understanding.

Personals

Prof. Alfred Vogt, ophthalmologist in Zurich, celebrated his sixtieth birthday. The *Schweizerische medizinische Wochenschrift* honored him with a special dedication.

Prof. Eduard Glanzmann, director of the children's clinic of the University of Berne, was appointed to the professorship of pediatrics.

Prof. Max Askanazy, professor of pathologic anatomy at the University of Geneva, has reached the age limit and retired. His pupil Dr. Erwin Rutishauser was chosen as his successor.

Prof. Bruno Galli-Valerio, professor of hygiene and bacteriology at the University of Lausanne, retired after rounding out fifty years of teaching. Dr. Paul Hauduroy, director of the health department of Colombes, near Paris, was appointed as his successor.

Prof. W. Ruzicka, of Zurich, was awarded the Marcel Benoist prize for 1938 in recognition of his contributions in the field of the sex hormones and the polyterpenes.

Deaths

Dr. Oscar Bernhard, founder of heliotherapy in surgical conditions, died Nov. 16, 1939, in St. Moritz at the age of 78 years. He was a pioneer in the field of modern heliotherapy. He was highly esteemed at St. Moritz and had honorary degrees from the Universities of Berne and Frankfort on the Main.

Dr. Alexander Tschirch, for many years professor of pharmacognosy and pharmaceutic chemistry at the University of Berne, died at the age of 84 years. Tschirch was born in Prussia and had established himself in Berne as early as 1890. Many of his contributions became well known, especially those on chlorophyll, resins and medicinal and useful plants. He was also the author of a large textbook on pharmacognosy.

Prof. Wilhelm von Speyr, for more than forty years (1890-1933) director of the asylum for mental diseases ("Waldau") in Berne and professor of psychiatry at the University of Berne, died at the age of 86 years. His main interest lay in the field of mental diseases caused by the use of alcohol. He was a firm believer in total abstinence.

Prof. Eugen Bleuler died in Zollikos, near Zurich, at the age of 83 years. His death closed a career rich in accomplishments. He became director of a large Swiss asylum when he was 29 years of age. Here he introduced a program of "work

therapy." He was one of the first leading psychiatrists to show an understanding of Freud's theories. In 1897 he was appointed director of the psychiatric clinic of the University of Zurich and for thirty years served in that capacity. His contributions were fundamental to the progress of psychiatry. His monograph on "Dementia Praecox," published in 1911, made him famous. His "Textbook on Psychiatry," published in 1918 and translated into different languages, gave fundamental expression to the psychologic trend in the study of this subject. In 1919 he published "Autistic-Undisciplined Medical Thinking and Its Cure," widely read and discussed also by others than psychiatrists and of great influence on medicine and psychiatric research. Bleuler had the genuine modesty of the really great scientist. He was an imposing, distinctive personality, a tireless worker and an excellent administrator and teacher.

BUENOS AIRES

(From Our Regular Correspondent)

Jan. 3, 1940.

The New Institute of Physical Research

In November 1939 the Instituto de investigaciones físicas aplicadas a la patología humana was dedicated in Buenos Aires. The new institute, of which Prof. M. Castex, professor of internal medicine, is the director, is closely connected with the Argentine Academy of Medicine. At the first meeting a series of lectures was given in Professor Castex's clinic by specially trained assistants. The subjects treated were the comparison of urobilinogen dosage by different methods, the spectrophotometric study of Ehrlich's diazo reaction, pleurophotography, allergic toxemia and a new respirator.

Conference on Alcoholism

The Liga Argentina contra el Alcoholismo recently held its second session on alcoholism, which lasted four days. It was well attended and engaged the interest of the country's physicians to a considerable degree. Prof. A. H. Roffo and Dr. Gonzalo Bosch, members of the faculty of medicine, presided. Dr. Pablo J. O. Wolff spoke on the dangers of the cocktail, Dr. Luis L. Boffi on the relations between tuberculosis and alcoholism, Dr. C. N. de Fischer on alcoholism and its effects on the child, Dr. M. T. F. de Guadino on alcoholism in women, Dr. A. R. Rossi on alcoholism as a social disease, Dr. D. Madanes on the legal bases for the fight against alcoholism and Dr. J. L. Pavía on the harmful effects of alcohol on visual acuity.

Combating Hydatidosis

The Asociación Médica Argentina in a recent joint meeting with the veterinary society discussed the national problem of hydatidosis. Francisco Rosenbusch, professor of veterinary parasitology, said that in some sections of Argentina more than 50 per cent of the live stock was infested with hydatid cysts and that the farmers of these areas had no conception of the dangers inherent in hydatidosis for human beings. Medical opinion emphasized the need of extensive educational publicity and of laws against hydatidosis. A national commission was organized in Argentina for combating hydatidosis. The necessity of such a fight is discernible from the facts disclosed by the veterinary José R. Serres that Argentina, Iceland, Australia, New Zealand and Uruguay are the principal countries afflicted with these parasites. The president of the republic of Uruguay in a recent message called attention to this problem. The Sociedad de Biología in Concepción, Chile, recently directed attention to the frequency of the disease in that city.

Commemoration of First Blood Transfusions with Sodium Citrate

Until 1914 blood transfusions were attended with many difficulties, since no method was known to prevent coagulation. The method perhaps mostly employed was that of Crile, consisting in the establishment of a direct anastomosis of the arteries of the donor and the receiver. In November 1914, during the first months of the World War, Prof. Luis Agote discovered that sodium citrate would prevent blood coagulation. He recognized at once the practical significance of his discovery and on November 9 performed the first transfusions in the presence of numerous physicians. The first press item of the discovery appeared in the New York *Herald* of November 14 and a further item on the following day. On November 22 the department of the exterior of Argentina made known the new method with the technical details to the diplomatic representatives of the belligerent countries stationed in Buenos Aires; that is, of Belgium, France, Germany, Great Britain, Russia and Turkey, a humane discovery in inhumane days. Two commemorative meetings were held in Buenos Aires in honor of the discovery and its discoverer.

The Academy of Surgery in Buenos Aires

The Society of Surgeons passed a resolution on the occasion of its twenty-fifth anniversary to convert the society into an academy. Now, three years later, the change has been made. The new Academy of Surgeons had its first meeting at the end of November 1939 with Prof. Rodríquez Villegas in the chair and was formally organized on December 20. The regular members of the former society constitute the membership of the new academy.

Personals

In November 1939 Juan R. Goyena, professor of internal medicine in Buenos Aires, celebrated his twenty-fifth anniversary as a teacher. Commemorative exercises were held. Goyena's field is principally that of gastric and intestinal disorders. He was chairman of the society for gastro-enterology, co-founder of the international society of the same name in Brussels and president of the Asociación Médica Argentina.

Dr. Gregorio Aráoz Alfaro, for twenty-five years president of the Argentine League against Tuberculosis, has resigned. The league, founded in 1901, now maintains two dispensaries with branches and owns a large building and two preventoriums for children in rural districts. A large sanatorium is in process of construction.

Deaths

Prof. Francisco Llobet, professor of surgery in Buenos Aires, died in retirement on Nov. 2, 1939. Prof. Bernardino Maraini, until recently professor of clinical urology in Buenos Aires, died November 10. Both were esteemed as clinicians.

Marriages

NORBORNE BERKELEY POWELL, Dallas, Texas, to Miss Elizabeth Mary Balas of McKeesport, Pa., Dec. 18, 1939.

GEORGE V. LAUNEY JR., Fort Worth, Texas, to Miss Harriet Louise Pitts of Alexandria, La., January 6.

HUB E. ISAACKS, Fort Worth, Texas, to Mrs. Irene Lee Tomlinson, of Houston, January 15.

WILLIAM L. COLE, Evansville, Ind., to Miss Barbara Louise Bagley, of St. Louis, Nov. 23, 1939.

GEORGE L. KRAFT, Chicago, to Miss Alleen Hoffland, of Soldiers Grove, Wis., February 7.

KENNETH I. SHEEK, Greenwood, Ind., to Miss Mary Thompson, of Indianapolis, Dec. 2, 1939.

TIM JOSEPH MANSON, Chattanooga, Tenn., to Miss Ellen Taylor at Knoxville in February.

JOSEPH H. BALTES to Miss Margaret I. Walsh, both of Fort Wayne, Ind., Nov. 23, 1939.

HERSCHEL C. CRAWFORD to Mrs. Nellie Lafayette Kelly, both of Atlanta, Ga., February 8.

JOHN B. OGILVIE to Miss Ann Bassett Jones, both of New York, February 2.

Deaths

David Murray Cowie ✠ Ann Arbor, Mich.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1896; professor of pediatrics and infectious diseases and chairman of the department at his alma mater since 1920, assistant to professor of the theory and practice of medicine from 1896 to 1899, first assistant in internal medicine from 1899 to 1906, instructor of pediatrics, 1906-1907, clinical professor of pediatrics from 1907 to 1909, clinical professor of pediatrics and internal medicine from 1909 to 1919 and professor of pediatrics and internal medicine, 1919-1920; secretary of the University of Michigan Pediatrics and Infectious Disease Society; member and past president of the American Pediatric Society and the Michigan Allergy Society; member of the American Academy of Pediatrics, International League Against Epilepsy, American Society of Clinical Investigation (vice president 1920-1921) and the American Association of Pathologists and Bacteriologists; fellow of the American College of Physicians; medical director and owner of a hospital bearing his name; associate editor of the *American Journal of Diseases of Children* from 1912 to 1924; aged 67; died, January 27, of coronary thrombosis.

George Shattuck Whiteside ✠ Pine Orchard, Conn.; Harvard Medical School, Boston, 1897; fellow of the American College of Surgeons; past president and secretary of the Portland (Ore.) City and County Medical Society; assistant in anatomy at his alma mater from 1898 to 1904; instructor, and later assistant professor of surgery, University of Oregon Medical School, Portland, from 1904 to 1916; served during the World War; at one time surgeon to the Multnomah Hospital, Portland; on the staff of the Greenpoint Hospital, Brooklyn, from 1932 to 1938; aged 66; died, January 29, in New York, of heart disease.

Webb William Weeks ✠ New York; Columbia University College of Physicians and Surgeons, New York, 1912; professor of ophthalmology at the New York University College of Medicine; member of the American Academy of Ophthalmology and Otolaryngology and the American Ophthalmological Society; fellow of the American College of Surgeons; served during the World War; surgeon to the New York Eye and Ear Infirmary; visiting surgeon, department of ophthalmology, Bellevue Hospital; aged 53; died, January 10.

Joseph Forrest Burnham ✠ Lawrence, Mass.; Harvard Medical School, Boston, 1901; member of the House of Delegates of the American Medical Association in 1915 and from 1920 to 1936; served during the World War; member and secretary of the staff of the Lawrence General Hospital; formerly secretary of the Essex North District Medical Society; aged 70; died, January 26, in the Phillips House of the Massachusetts General Hospital, Boston, of carcinoma of the prostate.

Alexander Crump Kirby ✠ Little Rock, Ark.; Washington University School of Medicine, St. Louis, 1917; assistant professor of pediatrics at the University of Arkansas School of Medicine; served during the World War; formerly member of an advisory council of the maternal and child health division, and consultant to the state board of health; aged 47; died, Nov. 4, 1939.

Henry Lawrence Swain ✠ New Haven, Conn.; Yale University School of Medicine, New Haven, 1884; clinical professor of otology emeritus at his alma mater; member, past president and secretary of the American Laryngological Association; laryngologist to the New Haven Dispensary and Hospital; aged 75; died, January 11, of esophageal varix and cirrhosis of the liver.

Thomas Le Roy Lauderdale ✠ Ranger, Texas; University of Oklahoma School of Medicine, Oklahoma City, 1913; fellow of the American College of Surgeons; past president of the Eastland County Medical Society; served during the World War; a medical director of the West Texas Clinic and Hospital; aged 50; died, January 1, of pulmonary tuberculosis.

Kimball Bannister, Phoenix, Ariz.; Northwestern University Medical School, Chicago, 1914; member of the Arizona State Medical Association; fellow of the American College of Surgeons; on the staffs of St. Joseph's and Good Samaritan hospitals; aged 50; died, January 30, of injuries received in an automobile accident.

George Alexander Van Wagenen, St. Petersburg, Fla.; College of Physicians and Surgeons, Medical Department of Columbia College, New York, 1871; for many years medical director of the Mutual Benefit Life Insurance Company; aged 94; died, January 2, of pyelonephritis and chronic myocarditis.

Jesus Maria Armaiz ✠ Vega Baja, P. R.; Hahnemann Medical College and Hospital of Philadelphia, 1911; formerly vice president of the Puerto Rico Medical Association; medical superintendent of a hospital bearing his name; aged 52; died, Dec. 23, 1939, in Santurce of typhoid and bronchopneumonia.

Walker Washington ✠ Staten Island, N. Y.; Bellevue Hospital Medical College, New York, 1885; past president of the Richmond County Medical Society; for many years president of a bank in Tottenville; on the staff of the Richmond Memorial Hospital; aged 79; died, Dec. 10, 1939.

Thomas Joseph Perkins, Baton Rouge, La.; Tulane University of Louisiana School of Medicine, New Orleans, 1892; member of the Louisiana State Medical Society; formerly superintendent of the East Louisiana State Hospital, Jackson; aged 70; died, Dec. 30, 1939, of heart disease.

James D. Jordan, Portsmouth, Ohio; University of Louisville (Ky.) Medical Department, 1894; member of the Ohio State Medical Association; on the staff of the Portsmouth General Hospital; aged 69; died, January 2, in a hospital at Dalton, Ga., of injuries received in an automobile accident.

Isidore J. Weida, Emmaus, Pa.; University of Pennsylvania Department of Medicine, Philadelphia, 1890; member of the Medical Society of the State of Pennsylvania; for many years member of the board of health; aged 73; died, Dec. 23, 1939, of hypertension and coronary disease.

George Lawrence McCormick ✠ Beaver Falls, Pa.; Western Pennsylvania Medical College, Pittsburgh, 1907; on the staffs of the Providence Hospital, Beaver Falls, and the Beaver Valley General Hospital, New Brighton; aged 59; died, Dec. 31, 1939, of coronary occlusion.

Wilkes H. Knolle, New Orleans; Tulane University of Louisiana School of Medicine, New Orleans, 1891; member and past president of the Louisiana State Medical Society; past president of the Orleans Parish Medical Society; aged 69; died, January 7, of coronary thrombosis.

Carl Ralph Martin, Fountain City, Tenn.; Chattanooga (Tenn.) Medical College, 1910; member of the Tennessee State Medical Association; served during the World War; formerly bank president, aged 58; died, January 8, in St. Mary's Hospital, Knoxville, of bronchopneumonia.

Claude Terrell Poole, St. Pauls, N. C.; North Carolina Medical College, Charlotte, 1907; member of the Medical Society of the State of North Carolina; served during the World War; aged 53; died, January 8, in the Veterans Administration Facility, Columbia, S. C.

Carl Welfley Frantz ✠ Confluence, Pa.; Western Pennsylvania Medical College, Pittsburgh, 1907; formerly bank president; owner and medical director of a hospital bearing his name; aged 55; died, Dec. 20, 1939, of carcinoma of the prostate with metastases.

Robert Henry Beverly, Springfield, Ill.; Bennett Medical College, Chicago, 1912; member of the Illinois State Medical Society; state district health superintendent for the state department of health; aged 61; died, January 22, in St. John's Hospital.

John Baker Haggard, Fort Leavenworth, Kan.; University of Tennessee Medical Department, Nashville, 1892; served during the World War; aged 71; died, January 9, in the Veterans Administration Facility, Wadsworth, of arteriosclerotic heart disease.

Benjamin A. Gipple, Alden, N. Y.; University of Buffalo School of Medicine, 1894; member of the Medical Society of the State of New York; for many years health officer; aged 74; died, Dec. 30, 1939, of coronary embolism and cerebral thrombosis.

Jefferson Duddleston Blything, Fontana, Calif.; Rush Medical College, Chicago, 1906; at one time city physician of Davenport, Iowa; aged 63; died, Dec. 2, 1939, in the Veterans Administration Facility, West Los Angeles, of brain tumor.

Thomas Brown Johnson ✠ Indianapolis; University of Maryland School of Medicine, Baltimore, 1906; served during the World War; for many years on the staff of the Methodist Hospital; aged 57; died, January 6, of coronary thrombosis.

Theodore Marion Du Bose Sr., Columbia, S. C., Medical College of the State of South Carolina, Charleston, 1881; member of the South Carolina Medical Association; aged 81; died, Dec. 25, 1939, of myocarditis and arteriosclerosis.

Joseph Henry Hauck, Terre Haute, Ind.; Eclectic Medical Institute, Cincinnati, 1899; member of the Indiana State Medical Association; served during the World War; aged 65; died, January 4, in the Union Hospital, of diabetes mellitus.

Bernard Bertram Wormser ✠ Scranton, Pa.; Jefferson Medical College of Philadelphia, 1902; served during the World War; on the staffs of the Scranton State and Hahnemann hospitals; aged 62; died, Dec. 28, 1939, of heart disease.

William H. Ditmars, Jonesville, Mich.; Detroit College of Medicine, 1896; member of the Michigan State Medical Society; president of the school board; aged 66; died, January 3, in the Hillsdale (Mich.) Hospital of cerebral hemorrhage.

Thomas Walker Tait, Philadelphia; Jefferson Medical College of Philadelphia, 1888; formerly on the staffs of the Methodist Hospital and St. Agnes Hospital; aged 76; died, Dec. 13, 1939, of granulocytopenia and peritonsillar abscess.

Charles Elliott Ristine, Knoxville, Tenn.; University of Pennsylvania Department of Medicine, Philadelphia, 1870; member of the Tennessee State Medical Association; Civil War veteran; aged 94; died, January 10, of pneumonia.

Frederick Edwin Tully, San Diego, Calif.; Marion-Sims College of Medicine, St. Louis, 1895; member of the California Medical Association; served during the World War; aged 71; died, Dec. 6, 1939, of coronary disease.

Elias H. Witmer, Lancaster, Pa.; University of Pennsylvania Department of Medicine, Philadelphia, 1877; member of the Medical Society of the State of Pennsylvania; aged 86; died, Dec. 13, 1939, of arteriosclerosis.

Robert Lee Hardwick, Mount Vernon, Ind.; Missouri Medical College, St. Louis, 1886; for many years county health officer; aged 76; died, January 5, of cerebral hemorrhage and carcinoma of the colon.

Ernest Darnall, Colt, Ark.; Memphis (Tenn.) Hospital Medical College, 1908; member of the Arkansas Medical Society; aged 56; died, January 2, in the Baptist Hospital, Memphis, of cerebral hemorrhage.

Julian Lloyd Waller, San Francisco; College of Physicians and Surgeons of San Francisco, 1904; member of the California Medical Association; served during the World War; aged 69; died, Nov. 15, 1939.

Napoleon Landry, Fitchburg, Mass.; School of Medicine and Surgery of Montreal, Que., Canada, 1893; aged 79; died, Dec. 21, 1939, in Lunenburg, of cerebral hemorrhage and arteriosclerosis.

James West Hingston, Chicago; Hahnemann Medical College and Hospital, Chicago, 1882; aged 81; died, January 29, in the West Suburban Hospital, Oak Park, Ill., of hypertrophy of the prostate.

Nathan Caldwell Doane, New Market, Tenn.; Tennessee Medical College, Knoxville, 1894; on the staff of the Jefferson Hospital, Jefferson City; aged 73; died, January 8, of coronary occlusion.

John P. Hawkins, Anniston, Ala.; Chattanooga (Tenn.) Medical College, 1894; member of the Medical Association of the State of Alabama; aged 70; died, January 1, of angina pectoris.

Solomon Wells Churchill, New York; Bellevue Hospital Medical College, New York, 1897; aged 80; died, January 15, in St. Luke's Hospital of cerebral hemorrhage and bronchopneumonia.

Claude E. Earle, Anderson, S. C.; College of Physicians and Surgeons, Baltimore, 1886; aged 79; died, Dec. 23, 1939, in the Anderson County Hospital of carcinoma of the prostate.

Milton H. Brown, Morgantown, W. Va.; Baltimore Medical College, 1893; member of the West Virginia State Medical Association; aged 71; died, January 10, of coronary thrombosis.

James Ernest Brooks, Chicago; Bennett Medical College, Chicago, 1910; member of the Illinois State Medical Society; aged 56; died, January 4, of arteriosclerosis and chronic nephritis.

Luther James Shepley, North Westport, Mass.; College of Physicians and Surgeons, Boston, 1902; served during the World War; aged 63; died, Dec. 19, 1939, of coronary occlusion.

David Thomas Bailey, Cleveland; University of Wooster Medical Department, Cleveland, 1900; aged 65; died, January 21, in the Cleveland Clinic Hospital of carcinoma of the pancreas.

George Abner Hammond, Dothan, Ala.; Baltimore Medical College, 1884; member of the Medical Association of the State of Alabama; aged 80; died, January 4, of chronic myocarditis.

William Thomas Joiner, Pittsview, Ala.; Atlanta Medical College, 1891; aged 80; died, January 8, in the City Hospital, Columbus, Ga., of uremia and hypertrophy of the prostate.

George Monroe Hite, Amelia, Ohio; Eclectic Medical College, Cincinnati, 1918; member of the Ohio State Medical Association; aged 50; died, January 20, of heart diseease.

Edward L. Wilkinson, Jacksonville, Fla.; College of Physicians and Surgeons, Baltimore, 1885; aged 79; died, Nov. 6, 1939, in St. Luke's Hospital of mesenteric thrombosis.

Thomas N. Ellis, Knoxville, Tenn.; Kansas City (Mo.) Hospital College of Medicine, 1885; aged 79; died, January 3, of myocarditis, chronic nephritis and hypertension.

Benjamin Augustus Crichlow, Charleston, W. Va.; Howard University College of Medicine, Washington, D. C., 1902; aged 66; died, Dec. 31, 1939, of gastric ulcer.

Welcome Turner Jones, Little Rock, Ark.; Western Reserve University Medical Department, Cleveland, 1893; aged 74; died, January 12, of mitral insufficiency.

Alfred G. Shissler, Shamokin, Pa.; University of Pennsylvania Department of Medicine, Philadelphia, 1889; aged 73; died, Dec. 9, 1939, of carcinoma of the lung.

Herman M. Doty, Chagrin Falls, Ohio; Western Reserve University Medical Department, Cleveland, 1873; aged 91; died, Dec. 29, 1939, of bronchopneumonia.

Louise Patterson, Glendale, Calif.; American Medical Missionary College, Chicago, 1899; aged 73; died, Nov. 17, 1939, of arteriosclerosis and myocarditis.

Llewellyn Fleet Luckett ✠ Washington, D. C.; Columbian University Medical Department, Washington, 1895; aged 68; died, Dec. 31, 1939, of heart disease.

William Eric A. D. Von Der Goltz, New York; Universität Basel Medizinische Fakultät, Switzerland, 1887; aged 77; died, Dec. 17, 1939, of heart disease.

Thomas Moore Acken ✠ New York; University of the City of New York Medical Department, 1893; aged 72; died, Dec. 11, 1939, of cerebral hemorrhage.

Maude Waterhouse Abbott, Canton, Ohio; Eclectic Medical Institute, Cincinnati, 1886; aged 79; died, January 2, of cerebral hemorrhage and arteriosclerosis.

Tandy Bartow Harrison, Charleston, Miss.; Memphis (Tenn.) Hospital Medical College, 1892; aged 77; died, Dec. 31, 1939, of cirrhosis of the liver.

Max Grossman, Brooklyn; Long Island College Hospital, Brooklyn, 1902; aged 58; died, January 5, in the Kings County Hospital of intestinal obstruction.

Catharine Phoebe Hayden, Ashland, Mass.; University of Colorado School of Medicine, Denver, 1894; aged 81; died, Dec. 26, 1939, of arteriosclerosis.

Franklin Noll, Jenkintown, Pa.; Jefferson Medical College of Philadelphia, 1892; aged 67; died, Dec. 16, 1939, of encephalomalacia and bronchopneumonia.

George Estus Garwood, Toledo, Ohio; Toledo Medical College, 1900; served during the World War; aged 75; died, January 5, of paralysis agitans.

Benjamin Iverson Hicks, Vicksburg, Miss.; Louisville (Ky.) Medical College, 1896; aged 68; died, January 16, of uremia and heart disease.

Albert F. Snell, Cleveland (licensed in Tennessee in 1889 and in Ohio in 1897); aged 83; died, Dec. 27, 1939, of arteriosclerotic heart disease.

William F. Birss, Grand Rapids, Mich.; Saginaw Valley Medical College, Saginaw, 1902; aged 61; died, January 13, of coronary thrombosis.

Charles Wesley Davis, Cincinnati; Medical College of Ohio, Cincinnati, 1887; also a druggist; aged 77; died, Dec. 20, 1939, of myocarditis.

James Joseph McMahon ✠ Port Allegany, Pa.; Jefferson Medical College of Philadelphia, 1927; aged 40, died, Dec. 9, 1939, of heart block.

James Whitworth, Clarksville, Tenn.; University of Nashville Medical Department, 1898; aged 63; died, Nov. 25, 1939, of angina pectoris.

Charles Damsky ✠ Lynn, Mass.; Middlesex College of Medicine and Surgery, Waltham, 1921; aged 45; died, Dec. 3, 1939, in Boston.

Robert Kirksey, Pickens, S. C.; College of Physicians and Surgeons, Baltimore, 1891; aged 71; died, Dec. 29, 1939, of pneumonia.

Clark Wesley Thomas, Findley, Ohio; Toledo Medical College, 1897; aged 75; died, Dec. 25, 1939, of acute dilatation of the heart.

Martin L. Sellers, Los Angeles; Barnes Medical College, St. Louis, 1899; aged 69; died, Nov. 24, 1939, of coronary sclerosis.

Bureau of Investigation

THE BAKER HOSPITAL AND J. L. STATLER, M.D.

In the story of Norman Baker, recently published in these pages, frequent reference was made to the Baker Hospital. It was noted that J. L. Statler, M.D., was one of those sentenced along with Norman Baker. The article contained many excerpts from Baker's biography, "The Throttle." However many significant events occurred in Baker's life prior to the publication of "The Throttle" which the biographer neglected to mention.

At the time of Baker's historic announcement in December 1929 that "Cancer Is Conquered," he opened the Baker Institute at Muscatine for the treatment of cancer, tumors, goiters, prostate gland troubles, stomach ulcers, rheumatism, gallstones and diabetes. Although neither Baker nor any of the persons associated with him in the enterprise had been licensed to practice medicine in Iowa, several physicians were employed by him at different times, apparently not for the purpose of treating or directing the treatment of patients but ostensibly for the purpose of making diagnoses. Each prospective patient was examined by a licensed physician so employed, who wrote his observations on a blank diagnosis chart containing, among other things, a statement of the nature, character and location of the disease from which the patient was alleged to be suffering. The charts did not contain specific directions as to the medicine or treatment to be administered. Attached to each diagnosis chart was a treatment card which seemed almost invariably to be signed in blank by a Dr. Bair at the request of Baker.

Apparently the sole medicines used, regardless of the so-called diagnosis, were a liquid mixture the formula of which was at that time known only to Baker and a powder the formula of which was at that time known only to Baker's associate, Hoxsey. Later the treatment cards were filled in by some person other than Dr. Bair. This procedure did not fool the Iowa courts. The Supreme Court of Iowa on Feb. 11, 1931, held that Baker, notwithstanding the elaborate screen he had attempted to interpose to hide his actual activities, was practicing medicine in violation of the law, and it enjoined him from practicing medicine (*State* v. *Baker*, 235 N. W. 313). Baker then made many attempts to reframe his corporate structure and developed devious business enterprises to evade this injunction. He tried and he failed!

The Supreme Court then found it necessary to adopt waiting tactics in order to call him to account for his flagrant violation of its injunction. Finally the law prevailed, and on Dec. 15, 1936 (*State* v. *Baker*, 270 N. W. 359), held Baker in contempt of court and imposed on him the maximum penalty. This the court frankly stated was "wholly inadequate"—a $50 fine and one day in jail. The Supreme Court used this enlightening language with respect to Baker's attempt to evade this injunction:

> "This defendant and accomplices and confederates in the operation of the Baker Hospital at Muscatine, Iowa, were engaged in perpetrating a stupendous fraud against the court. We cannot shut our eyes to such transparent trickery. A court so supine as to overlook such conduct would merit the contempt of all fair-minded men."

While the author of "The Throttle" may have omitted reference to these proceedings on the plea that the relative unimportance was reflected in the lightness of the fine, the incidents "throttled" Baker, so far as Iowa was concerned. As noted in the previous report, Baker moved the Muscatine Baker Hospital, lock, stock and barrel, to his already established hospital at Eureka Springs, Ark.

In connection with the case last referred to above (*State* v. *Baker*, 270 N. W. 359) it was brought out that Baker had attempted through the fiction of a lease of the Baker Hospital to Dr. J. L. Statler and others to circumvent the injunction. It would seem to follow that since the Supreme Court of Iowa denominated Baker's attempt to evade the injunction as a fraud on the court, those who aided Baker in doing so—and Statler was one of those persons—were likewise guilty of perpetrating a fraud on the court. It would likewise seem to follow that Statler in attempting to circumvent the injunction also prostituted his professional reputation in furthering the Baker Institute and in associating himself with Baker in his activities.

According to the available records, Johnson Lewis Statler was born in Sedgewickville, Mo., in 1883 and was graduated from Barnes Medical College, St. Louis, in 1909. He was licensed in Missouri that same year, in Oklahoma in 1910 and in Iowa in 1916, in both states by reciprocity with Missouri.

In an article in THE JOURNAL for July 31, 1937, it was noted that the application of Statler, doing business as the Baker Hospital, Muscatine, Iowa, for authority to transmit programs to stations in Canada and Mexico was denied by the Federal Communications Commission. It was noted that he was a long-time associate of Norman Baker and lessee of the Baker Hospital. The Federal Communications Commission, in denying the Statler application to maintain a radio broadcast studio at Muscatine for the purpose of making transcriptions to be transmitted to stations in Canada and Mexico, was constrained to find that the applicant (Statler) was not the real party in interest in the case. According to the Federal Communications Commission's report of the hearing, "the only evidence offered by applicant with respect to a need for the proposed service related to the falling off of business of the Baker Hospital when KTNT was deleted . . . It is our opinion that the applicant has failed to show that the program service proposed to be rendered [advertising the Baker Hospital] would be in the public interest."

According to a news item appearing in the Chicago *Tribune* for Feb. 28, 1932, and referring to some of the facts brought out in Baker's suit against the A. M. A., "Statler, whom former employees had identified as the leading diagnostician of the institute, admitted to Judge G. N. Nordbye that he could not explain how the Baker 'cure' was supposed to seek out and destroy cancerous cells."

As a matter of fact, he not only did not know how it worked but he knew that it did not work in a great many cases. Previously he had signed hundreds of death certificates of persons who had died at the Baker Institute at Muscatine, Iowa. Selecting the cause of death from a few such certificates chosen at random, one finds "recurrent cancer of breast," "sarcoma of liver," "cancer of stomach," "cancer of left breast," sarcoma," "cancer of the mouth," "cancer of cervical stump," "sarcoma of the thyroid," "cancer of the neck," "cancer of rectum and stomach" in individuals from Illinois, Iowa, Alberta, North Dakota, Michigan and Wisconsin. At this time and subsequently Statler was cooperating with Baker in promoting Baker's claim that cancer was curable.

Things did not always go well with Statler, however. The Davenport (Iowa) *Democrat* reported on Oct. 23, 1933, that he had filed a bankruptcy petition in the federal district court at Davenport, with debts of over $9,000, $7,500 of which represented three judgments obtained against him in Van Buren County. Furthermore, Baker and Statler did not always hit it off well; reference to the May 18, 1932, issue of the same newspaper indicated that N. G. Baker and the Baker Investment Company were plaintiffs in two replevin actions filed in an effort to gain possession of the Baker Hospital, and that Dr. J. L. Statler was named defendant in one case and J. L. Statler and Rennie A. Bellows were joint defendants in the other action. Baker's action against Statler was subsequently dismissed.

It is apparent that Statler later smoothed over his difficulties with Baker for the two of them are next found working hand in glove in the operation of Baker's hospital in Eureka Springs, Ark. As a result of this reconciliation Statler now faces the prospect of lodging and meals at Uncle Sam's expense for one year and one day.

When an individual who is totally devoid of any scientific training, let alone any formal medical education, attempts to treat patients who are suffering from a serious disease, he must comply with certain regulations—or at least to make a pretense of complying with such regulations. The usual technic is to associate with him some one who does hold a license to practice medicine. Baker was eventually stopped in Iowa. The pretext which he used in trying to avoid difficulty with the law by leasing his hospital to Statler was not sufficient to save the institution. Obviously Baker could not have gained much headway if he had not had associated with him a man who was licensed to practice, a man who could legally place after his name the initials "M.D." What price was paid to Statler for supporting the ideas and carrying out the work in the Baker Hospital is not known, but it certainly should have been a goodly sum, for

Statler, by joining Baker, made himself a pariah in his chosen profession. At least temporarily he is, of course, not practicing medicine; so far as the Bureau can determine, he is now behind bars pending any subsequent arrangements that may be made in connection with his sentence, which, as it will be recalled, was one year and one day in jail.

Here, then, is a man—recognized as a physician—whose cooperation was necessary to perpetrate the Baker fraud. Although graduating from a reputable medical school, he abused his right and privilege to practice medicine. Once, no doubt, he listened to the high precepts and ideals which are impressed on the student of medicine. Could he have thought of them as he signed death certificates for those who died in the Baker Hospital? Does he ponder on the past as he sits in jail awaiting developments in a case in which he was found guilty of fraud? It is a pitiful spectacle—a man fully qualified, both by medical training and by legal recognition of that medical training, to become an important factor in the life of any community in which he settled finds himself instead behind bars, after having signed hundreds of death certificates for persons who were told that their cancers would be cured. There is a lesson in the life of this charlatan that every student in our medical schools today should learn.

MISBRANDED "PATENT MEDICINES"

Abstracts of Notices of Judgment Issued by the Food and Drug Administration of the United States Department of Agriculture

[EDITORIAL NOTE.—The abstracts that follow are given in the briefest possible form: (1) the name of the product; (2) the name of the manufacturer, shipper or consigner; (3) the composition; (4) the type of nostrum; (5) the reason for the charge of misbranding, and (6) the date of issuance of the Notice of Judgment—which is considerably later than the date of the seizure of the product and somewhat later than the conclusion of the case by the Food and Drug Administration.]

Fisher's Diuretic Alterative.—Mrs. E. Heinz, Denver. Composition: Chiefly water, alcohol, sugar and small amounts of plant material extracts. Fraudulently claimed to cure dropsy and skin diseases, dissolve gallstones, strengthen the nerves, etc.—[*N. J. 30223; June 1939.*]

Fisher's Gastric Assimilator.—Mrs. E. Heinz, Denver. Composition: Alcohol, water and plant material extracts. Fraudulently represented for chronic stomach disorders, pain of childbirth, etc.—[*N. J. 30223; June 1939.*]

Fisher's P P P.—Mrs. E. Heinz, Denver. Composition: Essentially water, alcohol, epsom salt and flavoring. Fraudulently represented as "an emergency remedy" for conditions not named.—[*N. J. 30223; June 1939.*]

G. S. I. Gly-So-Iodonate.—National Medical Research Laboratories, Milwaukee. Composition: Essentially water, alcohol, glycerin, common salt and small quantities of carbonates, sulfates, iodides, phosphates and borates, with traces of formaldehyde and iodoform. Adulterated because its strength fell below the professed quality or standard under which it was sold, namely, an antiseptic. Misbranded because representations made for it as an "antiseptic surgical first aid" and as a remedy for burns on scalp and skin were fraudulent.—[*N. J. 30220; June 1939.*]

Miller's (Dr.) Intraclean.—Miller Co., Inc., Newark, N. J. Composition: Essentially broken senna leaves and buckthorn bark, with a small amount of agar agar. For nervousness, stomach, kidney and liver disorders, obesity, high blood pressure, backache, etc.—[*N. J. 30224; June 1939.*]

Mother Hubbard Camphorated Oil.—Mother Hubbard Products Co., Inc., Chicago. Composition: Not more than 10.6 per cent of camphor. Adulterated because it did not contain 19 per cent of camphor as required for camphorated oil by the U. S. Pharmacopeia, and misbranded because fraudulently represented as an effective treatment for asthma and croup.—[*N. J. 30025; May 1939.*]

Mother Hubbard Remedies Laxative Head-Cold Tablets.—Mother Hubbard Products Co., Inc., Chicago. Composition: Not more than 0.913 grains of acetanilid per tablet. Adulterated because not containing the 2 grains of acetanilid per tablet declared on the package, and misbranded because claimed to contain no "harmful habit-forming drugs," whereas they did contain acetanilid.—[*N. J. 30025; May 1939.*]

Orchotine Tablets.—Hudson Pharmacal Co., Inc., Union City, N. J. Composition: Animal tissue, probably glandular in nature, with 1/25 grain of extract of nux vomica per tablet. Adulterated because not containing active principles of testicular glands as represented, and misbranded because fraudulently represented to cure nervous exhaustion, sexual apathy and "subefficiency" in men.—[*N. J. 30222; June 1939.*]

Tonsol.—Tonsol Co., Elmira, N. Y. Composition: An aqueous solution of a mild silver proteinate compound. Fraudulently represented to cure tonsil disorders, diphtheria, quinsy, adenoids, etc.—[*N. J. 30225; June 1939.*]

Correspondence

"PRIMARY TUBERCULOUS INFECTION ATTACK RATES"

To the Editor:—In the Dec. 16, 1939, issue of THE JOURNAL, page 2204, Stewart and his associates published a paper on "Primary Tuberculous Infection Attack Rates." Among the group studied were nurses training in (1) a general hospital with no tuberculosis service, (2) a general hospital with a six weeks tuberculosis service, which I shall designate as hospital A, (3) a general hospital with a three months tuberculosis service, which I shall designate as hospital B, and (4) a six weeks service in a tuberculosis sanatorium and the hospital where the nurses receive the remainder of their three years training, which will be designated as C.

The report attempts to compare the infection rate obtained from the six weeks service in a tuberculosis sanatorium with the three year infection rate in the two general hospitals which have a tuberculosis service. This is manifestly an unscientific and unfair comparison.

According to one of the collaborators (Boynton, Ruth E.: Incidence of Tuberculous Infection in Student Nurses, *Am. Rev. Tuberc.* **39**:671 [May] 1939), 29.9 per cent of the student nurses entering the training school at hospital C during the years 1933 to 1937 were tuberculin positive at the beginning of their hospital experience, and during the first year 17.9 per cent of those who were tuberculin negative became tuberculin positive, even though they had not yet had their tuberculosis service. In a personal communication, Boynton informed me that 60.9 per cent of the nurses who entered the training school at hospital C were tuberculin positive at the end of their training. This includes six weeks in a tuberculosis sanatorium.

Her report of the percentage of nurses who were tuberculin positive at the beginning and end of training means that seventy of each hundred nurses were tuberculin negative at the beginning of training while only thirty-nine were tuberculin negative at the end of training. The difference between the seventy and the thirty-nine is thirty-one. This represents the number of negative nurses out of each hundred who became infected during their three year training period. This is 43 per cent of the original negative group of seventy. Dividing that by 3, representing the number of years spent in training, as was done for hospitals A and B, one finds that hospital C has an average annual increase in infection of 14.3 per cent in contrast to 19.8 per cent for hospital A and 29.7 per cent for hospital B. When the six weeks contact at the sanatorium is considered by itself, the authors place "the crude annual primary infection attack rate" at 115.4 per cent instead of at 14.3 per cent. This is arrived at by multiplying ten weeks, the time interval between the tuberculin test prior to beginning the six weeks service in the sanatorium and the tuberculin test three or four weeks after the service is ended, by 5.2, which is the number of times ten weeks will go into a year. In using this figure the authors consider the whole ten weeks as spent in the tuberculosis environment, even though only six weeks of that time is spent at the sanatorium.

The authors also mention the fact that a tuberculosis service has been established "at the Minneapolis General Hospital, where attempts are being made to perfect a technic which will prevent attendants from acquiring infections with tubercle bacilli while working with tuberculous patients." This will be designated as hospital D. The technic used consists, in the main, of changing a cap, mask and gown and scrubbing the hands and arms for two minutes before the care of each patient in the same ward. The tuberculosis service consists of one thirty bed floor in the contagious unit. While the student nurse is assigned to

the contagious unit for six weeks, she does not spend more than two weeks of that time on the tuberculosis floor. However, not more than one half of the beds on this floor are set aside for the care of tuberculosis, and at times there have been as few as two tuberculous patients in that unit. Therefore her two weeks service there cannot be considered the equivalent of more than a one week service in a tuberculosis sanatorium, if that long.

In spite of that, another of the collaborators, Myers, at the meeting of the Canadian Tuberculosis Association held in Winnipeg in September 1939, reported that during a certain twelve months period ten of the eighty-nine nurses who were tuberculin negative at the beginning of their contagious service, two weeks of which is spent in the tuberculosis unit, were tuberculin positive at the end of that service. However, he stated that four of the ten had cared for open cases of tuberculosis elsewhere than in the tuberculosis service and so should be excluded from the study. This reduced the number who apparently acquired a tuberculous infection in the new tuberculosis service to six. This was 6.7 per cent of the eighty-nine. He stated further that it was the lowest "crude annual primary infection attack rate" that he knew of in connection with any tuberculosis service in the country, and he attributed the so-called low rate to the type of contagious technic used.

No allowance was made at hospitals A, B or C for any source of infection outside of the tuberculosis service. That is not necessary for hospitals A and B, because the nurses spend their entire three years there and whatever infection they acquire outside the tuberculosis service would be included in their average annual infection rate. However, it is a very important consideration for hospital C, as the nurses spend only six weeks in the tuberculosis service and then go back to their regular environment. In this instance the tuberculosis service is charged with all the infection that developed during the period under consideration (ten weeks).

The second point deals with the statement made by the authors on the effect of the length of contact with tuberculous patients on the infection rate when, in comparing the "crude annual primary infection attack rates" in hospitals A and B, the authors state that "the increases in infections recorded for the two groups of nurses who worked in wards for tuberculous patients were roughly proportional to the length of time each group spent in this type of service." Accepting that statement as true, one can then multiply 6.7 per cent, the so-called annual infection rate following a one week exposure in the tuberculosis service in hospital D by 6, representing a six weeks contact at the sanatorium for nurses from hospital C. This results in a six weeks infection rate of 40.2 per cent at hospital D in contrast to one of 22.2 per cent for hospital C. Using the same statistical method as the authors did in arriving at the crude annual primary infection rate of 115.4 per cent for hospital C, one would multiply the 40.2 per cent by 5.2, as that is the number of times ten weeks will go into fifty-two weeks. This gives the student nurses who have worked in the tuberculosis unit at hospital D a "crude annual primary infection attack rate" of 209.04 per cent.

This rate is, of course, impossible for at least two reasons: (1) more than 100 per cent of nurses cannot become infected, and (2) even though the nurses work in the tuberculosis service for a year there would be a few who would not react positively to the tuberculin test. Still it is no more absurd than is the rate of 115.4 per cent, which the authors give as the "crude annual primary infection attack rate" for the tuberculosis service at the sanatorium. In spite of its absurdity, I believe it does prove rather conclusively that the elaborate contagious technic in use in the tuberculosis unit of hospital D has not been any more effective, if as effective, in preventing the transmission of infection from patient to nurse than the technic in use at the sanatorium.

It seems to me that when one begins to compare "crude annual primary infection attack rates" one should use comparable facts in arriving at conclusions and not compare a three year period for one hospital with only a six weeks tuberculosis service in another hospital. When like is compared with like, there is some basis for judging the results, but when dissimilar things are compared one has no justification whatever in drawing any particular conclusions from the study.

E. S. MARIETTE, M.D., Oak Terrace, Minn.
Superintendent, Glen Lake Sanatorium.

GRADE A VERSUS GRADE B MILK IN NEW YORK CITY

To the Editor: — Mayor LaGuardia's public proclamation urges substitution of grade B for grade A milk to combat the high cost of the de luxe product. Two issues are involved: cost and quality. Economy is a great revenue to thrifty adults but a selective virtue to helpless infants. Grade A milk is still the most economical food for infant nutrition when compared with the total cost of equivalent nutrients. If it can be made available at less cost, so much the better. Until then, superior milk should remain the choice for infant feeding.

Grade A is preferable to grade B milk for infants because of superior bacteriologic control. The former averages about 50,000 bacteria per cubic centimeter before pasteurization while the latter averages about 250,000 per cubic centimeter. The bacterial count of milk is an index of the sanitary quality. Although milk with a high bacterial count is not necessarily harmful to health if the flora is innocuous, milk with a low bacterial count may be unsuitable if charged with pathogenic organisms. Metabolic studies of artificially fed infants have shown that boiled milk with a high bacterial count is less efficiently utilized and more apt to produce digestive disturbances than boiled milk with a low bacterial count.

Sanitary supervision of the milk supply contributed greatly to lowering the incidence of gastrointestinal diseases in infants. Why retrogress? If grade A milk is to be eliminated from the sanitary code, certified milk with less than 500 bacteria per cubic centimeter should be advocated for infants and grade B milk for older children and adults.

I. NEWTON KUGELMASS, M.D., New York.

SENSITIVITY TO SOLUTION OF POSTERIOR PITUITARY

To the Editor:—The January 20 issue of THE JOURNAL carries a letter by Bernard Seligman citing a case of hypersensitivity to solution of posterior pituitary and mentioning McMann's report in the Oct. 14, 1939, issue. Both cases showed general collapse. I do not know whether urticaria following injection of this substance, but without the collapse symptoms, is rare but cite the following:

For the induction of labor, my wife was given 1 minim (0.06 cc.) of solution of posterior pituitary hypodermically, and the injection was followed in ten or fifteen minutes by an urticarial eruption. The eruption was general, caused a great itching and was relieved by epinephrine after half an hour. Following delivery she was given solution of posterior pituitary again by mistake (the nurse had been ordered not to give it); the urticaria again followed and was again relieved by epinephrine. There was no respiratory distress, the pulse remained strong, regular and at about the same rate during the period of urticaria; the epinephrine was given to relieve the itching, not because any circulatory failure was impending. Pituitary had been given after two previous deliveries but without any unusual reaction.

A. L. ABBETT, M.D., Oakland, Calif.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

TUBERCULIN TESTING METHODS

To the Editor:—**There has been a great deal of agitation in regard to the method of tuberculin testing of human beings. Some advocate the Pirquet, others the Mantoux and still others the patch test. I recently read an article by Wolff, of San Francisco, on the technic of a percutaneous test in which he stated that the results of his ointment were practically equal to the Mantoux test. I have since gone through the literature but have been unable to find verification of this work. Might I have your opinions of the value of patch tests with the various ointments in use and the relation of this procedure to the Mantoux test.**

Edward M. Jeppson, M.D., Ogden, Utah.

ANSWER.—In 1890 and for thirteen years thereafter, tuberculin for testing was administered by the subcutaneous method. The doses were large and constitutional reactions manifested by such symptoms as temperature elevation and malaise were important in determining the presence of tuberculosis.

In 1903 Pirquet conceived the idea of making a shallow scarification in the skin and applying tuberculin in order to produce a local reaction and avoid constitutional manifestations. In 1907 Pirquet (*Deutsche med. Wchnschr.* **33**:865, 905, 1907) published the results of his work. Unfortunately, the test became known as the Pirquet test rather than the cutaneous tuberculin test. Pirquet's method of administering tuberculin has been extensively used. The chief objection to the administration of tuberculin by Pirquet's method is that there is no way of knowing how much tuberculin actually reaches the abraded area. Its administration is also time consuming. Moreover, in some cases the tuberculin is promptly rubbed from the area by the patients and so little is left as to result in no reaction. However, today in the hands of experts such as Slater, of Minnesota, and Chadwick, of Massachusetts, the cutaneous tuberculin test of Pirquet is satisfactory in determining the presence or absence of sensitivity of tissues to tuberculoprotein.

In 1908 (*München. med. Wchnschr.* **55**:217, 1908) a method of administering tuberculin was reported which consisted of using a pomade of equal parts of hydrous wool fat and pure tuberculin. This was rubbed over an unabraded area of skin about 5 cm. in diameter for one minute. The area was then exposed to the air for ten minutes and no dressing was applied. Unfortunately, this became known as the Moro test rather than the transcutaneous or percutaneous test. Since Moro presented his work a number of physicians have slightly modified his method of administration. For example, Lovett (*Am. J. Dis. Child.* **37**:918 [May] 1929) found that by vigorously rubbing an area of skin over the sternum with ether much of the oil was removed from the pores. Therefore, when a piece of concentrated old tuberculin the size of a pinhead was rubbed into the area, more entered the pores and a much better result was obtained than by Moro's original method.

In 1933 Wolff (*Am. Rev. Tuberc.* **27**:308 [March] 1933) reported a modification of the percutaneous test of Moro, which consisted of first cleansing an area in the paravertebral region between the eighth and eleventh thoracic vertebrae with green soap and water, and after drying it was bathed with benzine to remove the oil from the pores. To the area he applied a special tuberculin ointment the size of a pea. This was covered with a piece of adhesive tape 2 inches square, which was tightly applied. By this method Wolff reported good results from the standpoint of determining the presence of sensitivity to tuberculin.

Vollmer (*Am. J. Dis. Child.* **54**:1019 [Nov.] 1937) has introduced another modification of the percutaneous test of Moro which is designated as the tuberculin patch test. Its administration consists of cleansing an area of skin with acetone, ether or benzine, after the removal of any hair that may be present. The patch to be applied consists of a strip of tape to which has been attached two squares (1 by 1 cm.) of thin filter paper saturated with undiluted tuberculin and dried. These are placed on the tape 1 cm. apart. The adhesive side of the tape is protected with crinolin, which must be removed before the application of the patches. The tape is then tightly applied with the patches adjacent to the skin, where it remains for forty-eight hours. It is best to allow another forty-eight hours to elapse after the removal of the patches before reading the test.

Vollmer and Goldberger (*Am. J. Dis. Child.* **57**:1272 [June] 1939) have reported that this test is equal in determining the presence of sensitiveness to tuberculin to the intracutaneous test, when 0.1 mg. of old tuberculin is used. Unfortunately the intracutaneous test is not considered complete until the individual who has failed to react to smaller doses has been tested with a full milligram of tuberculin. When the second dose is not administered, the test may fail in as many as 10 to 20 per cent of persons whose tissues are sensitized to tuberculin. To overcome this discrepancy, Vollmer has recommended that all persons who do not react to the patch test have an intracutaneous test administered with a full milligram of tuberculin.

Objections which have been presented to the tape and patch methods of administering tuberculin are: 1. It is time consuming. 2. Many persons object to having adhesive tape on the skin and a few are highly sensitive to adhesive tape. Many complain of the itching sensation produced by the tape. 3. With excessive perspiration, such as may occur among students in gymnasiums, athletes or adults whose work causes perspiration, the adhesive tape may actually fall off. 4. Many persons dislike to omit bathing for forty-eight hours while the tape is on the skin. 5. The subject who does not react to the patch test must be seen five times: (*a*) to apply the tape, (*b*) to remove it, (*c*) to observe the area forty-eight hours later, (*d*) to administer the intracutaneous test and (*e*) to observe the area for presence or absence of reaction.

In 1908 Mantoux (*Compt. rend. Acad. d. sc.* **149**:355, 1908) presented a method of administering tuberculin which consisted of introducing with a fine hypodermic needle into the layers of the skin a measured amount of tuberculin. This, unfortunately, is spoken of as the Mantoux test rather than the intradermal or intracutaneous tuberculin test. Usually 0.1 cc. of a dilution of 1:10,000 or 1:1,000 of tuberculin is administered as the first dose, that is, 0.01 or 0.1 mg. of tuberculin. If no reaction occurs in from forty-eight to seventy-two hours the test is repeated by using 0.1 cc. of a dilution of 1:100. This amounts to 1 mg. of tuberculin. If no reaction occurs the individual being tested is thought to be free from tuberculous infection. When purified protein derivative is used, the corresponding doses are administered.

There are persons who object to instrumentation, including needles, for any purpose. However, where good health education work has been done, these persons are greatly in the minority. The fact that this minority refuses the test is not a good argument against it because its administration differs little or not at all from the method employed in giving Dick or Schick tests. Moreover, in administering such immunizing substances as toxoid, the same sized needle is used as in the administration of the tuberculin test.

The advantages of the intracutaneous method are that a measured amount of tuberculin is introduced and remains exactly where we desire it to be; it cannot be removed by the subject. No tape or bandaging of any kind is necessary. Little time is consumed in administering the test. Where large numbers are to be tested and there is good organization, a single experienced physician is able to administer several hundred tests an hour.

This has become the standard method of administering tuberculin in this country and is strongly recommended by practically all organizations engaged in tuberculosis work.

SUBSTANCES INTERFERING WITH TESTS FOR ALCOHOL IN URINE

To the Editor:—**Will you kindly tell me whether or not there is anything that will give the alcohol test in urine besides alcohol?**

B. C. Boston, M.D., Waterloo, Iowa.

ANSWER.—Reducing substances are found in distillates from normal urine to the extent of about 0.003 per cent. The quantity is too small to interfere with the test for alcohol when used to confirm alcoholic influence. The reducing substances have not been completely identified, but Harger has shown that they arise at least in part during the process of distillation. It has been said that ether, acetone and chloroform may give false readings for alcohol. These substances have been proved to be without influence in the test for alcohol when potassium bichromate is used as a direct oxidizing agent according to a technic described by Heiser in the *American Journal of Clinical Pathology* **4**:182 (March) 1934. Since this paper was written it has been discovered that formaldehyde, which may appear in the urine from the ingestion of methenamine, may reduce potassium bichromate to a slight extent. In order to get some specific information, 1 Gm. (15 grains) of methenamine was taken by mouth and repeated urinalyses revealed a maximum reduction of potassium bichromate corresponding to 0.021 per cent of alcohol by weight. Formaldehyde in the urine can be detected with ease and can be removed from the distillate.

VALVULAR HEART DISEASE AND PREGNANCY

To the Editor:—**A woman aged 27 who has valvular heart disease (mitral) with some pulmonary edema is about seven months pregnant. I am worried as to which is best: to protect the mother by an early delivery in about thirty days or to protect the baby and let the mother go to term. She rests two hours, is up two and uses four pillows to sleep, taking 1½ grains (0.1 Gm.) of digitalis daily. She has blood pressure of 96 systolic and 76 diastolic and a pulse rate of 108; her feet are not swelling, and on gross examination the urine was almost normal. If she goes to a hospital, what is the best way to induce premature labor?**

Nathaniel J. Bucklin, M.D., Roodhouse, Ill.

ANSWER.—It seems probable that the pulmonary congestion or edema present in this young woman with mitral stenosis is due not to heart failure but to the combined and mechanical effect of mitral stenosis, tachycardia and the extra work of pregnancy. It will probably be safe to allow her to go to term if she remains quiet in bed and chair in order to keep the heart rate down and uses digitalis for the same reason. The heart strain will become less in the last month and it is probable that she will deliver herself. There is likely to be more strain caused by inducing premature labor now than by carrying out the measures that have been mentioned.

TONSIL REMOVAL BY WARING SUCTION METHOD

To the Editor:—**Will you please advise me as to how the Waring suction technic and method for the removal of tonsils is regarded by laryngologists—its merit or advantages, if any, and its disadvantages, if any.**

R. A. Young, M.D., DuBois, Neb.

ANSWER.—The Waring suction technic and method for the removal of tonsils is not in as widespread use as dissection and the various forms of the Ring instrument technic. The advantages claimed are that blood and infectious secretions are kept out of the field of operation and the possibilities for inhalation are thereby much reduced. From the standpoint of trauma, the average operator would probably obtain with this method a smoother tonsillar fossa and be much less apt to tear tissues than would be the case in an indifferently performed dissection operation. This would not hold for the experienced dissector or user of instruments such as the Sluder and the Beck tonsillectomes.

SULFANILAMIDE IN LEUKEMIA

To the Editor:—**Are there any contraindications or therapeutic reasons for the use of either sulfanilamide or sulfapyridine in acute myelogenous leukemia?**

M.D., Illinois.

ANSWER.—There is no reason to believe that the use of either sulfanilamide or sulfapyridine is contraindicated in acute myelogenous leukemia, provided a definite indication for its use in the control of an infectious process arises. Neither of the drugs has had any effect in the control of either acute lymphatic or myelogenous leukemia, and there is no reason to believe that they will depress the granulocytic element in the bone marrow unless the patient happens to have a peculiar idiosyncrasy to these drugs. Any treatment with either of these drugs designed to affect the white blood cells directly is highly experimental, and its therapeutic value is extremely questionable.

GLASS EATING

To the Editor:—**In Queries and Minor Notes in The Journal Dec. 23, 1939, page 2341, was an inquiry from M.D., Connecticut, relative to eating glass. I was called to a nearby fire-house to witness a Negro about 40 years old who, in my presence, (1) chewed and swallowed two safety razor blades, (2) swallowed several 8 penny nails, (3) chewed and swallowed several large pieces of broken milk bottle glass, (4) inserted and closed a safety pin through the glans penis and (5) inserted a safety pin through the left biceps muscle. I looked into his mouth. His teeth were ground down flat. The buccal mucosa was thickened and grayish. He told me he was never operated on for obstruction and passed everything he swallowed, only rarely resorting to digital extraction. This practice had been engaged in for the previous fifteen or twenty years.**

Anthony Ambrose, M.D., Newark, N. J.

REACTION TO SOLUTION OF POSTERIOR PITUITARY

To the Editor:—**I recently had a reaction to solution of posterior pituitary in a multipara to whom I had administered it in four previous deliveries. On January 19 at 3 a. m. I administered 0.5 cc. of solution of posterior pituitary. After about five minutes the patient complained about itching of the back. An alcohol rub did not stop it. A rash quickly spread over all the skin, which became scarlet with both small and large wheals. This was followed by choking and a feeling of a hardness of the tongue. A quick injection of epinephrine worked rapidly. After twenty-four hours the mother and baby were in good condition. However, the site of the injection, about the size of a half dollar (30 mm.), remained swollen and red.**

G. E. Paolazzi, M.D., Canton, Ohio.

Medical Examinations and Licensure

COMING EXAMINATIONS

NATIONAL BOARD OF MEDICAL EXAMINERS SPECIAL BOARDS

Examination of the National Board of Medical Examiners and Special Boards were published in THE JOURNAL, February 24, page 681.

STATE AND TERRITORIAL BOARDS

ALABAMA: Montgomery, June 18-20. Sec., Dr. J. N. Baker, 519 Dexter Ave., Montgomery.

ALASKA: Juneau, March 5. Sec., Dr. W. W. Council, Box 561, Juneau.

ARIZONA: *Basic Science.* Tucson, March 19. Sec., Dr. Robert L. Nugent, University of Arizona, Tucson. *Medical.* Phoenix, April 2-3. Sec., Dr. J. H. Patterson, 826 Security Bldg., Phoenix.

ARKANSAS: *Basic Science.* May or June. Sec., Mr. Louis E. Gebauer, 701 Main St., Little Rock. *Medical* (Regular). Little Rock, June 6-7. Sec., Dr. D. L. Owens, Harrison. *Medical* (Eclectic). Little Rock, June 6-7. Sec., Dr. Clarence H. Young, 1415 Main St., Little Rock.

CALIFORNIA: *Oral examination* (required when reciprocity application is based on a state certificate or license issued ten or more years before filing application in California), San Francisco, April 17. *Written examination.* San Francisco, June 24-27. Sec., Dr. Charles B. Pinkham, 1020 N St., Sacramento.

COLORADO: *Basic Science.* Denver, March 6-7. Sec., Dr. Esther B. Starks, 1459 Ogden St., Denver. *Medical.* Denver, April 2-5. Sec., Dr. Harvey W. Snyder, 831 Republic Bldg., Denver.

CONNECTICUT: *Medical.* Hartford, March 12-13. *Endorsement.* Hartford, March 26. Sec., Dr. T. P. Murdock, 147 W. Main St., Meriden. *Homeopathic.* Derby, March 12-13. Sec., Dr. Joseph H. Evans, 1488 Chapel St., New Haven.

DELAWARE: *Examination.* Dover, July 9-11. *Reciprocity.* Dover, July 16. Sec., Medical Council of Delaware, Dr. Joseph S. McDaniel, 229 S. State St., Dover.

DISTRICT OF COLUMBIA: *Basic Science.* Washington, April 22-23. *Medical.* Washington, May 13-14. Sec., Dr. George C. Ruhland, 203 District Bldg., Washington.

FLORIDA: *Basic Science.* De Land, May 25. Sec., John F. Conn, De Land. *Medical.* Tampa, June 17-18. Sec., Dr. William M. Rowlett, Box 786, Tampa.

GEORGIA: Atlanta, June. Joint-Sec., Mr. R. C. Coleman, 111 State Capitol, Atlanta.

IDAHO: Boise, April 2. Dir., Bureau of Occupational Licenses, Mr. H. B. Whittlesey, 355 State Capitol Bldg., Boise.

ILLINOIS: Chicago, April 2-4. Acting Superintendent of Registration, Mr. Lucien A. File, Springfield.

INDIANA: Indianapolis, June 18-20. Sec., Board of Medical Registration and Examination, Dr. J. W. Bowers, 301 State House, Indianapolis.

IOWA: *Medical.* Des Moines, March 4-6. *Basic Science.* Des Moines, April 9. Dir., Division of Licensure and Registration, Mr. H. W. Grefe, Capitol Building, Des Moines.

KANSAS: Kansas City, June 18-19. Sec., Board of Medical Registration and Examination, Dr. J. F. Hassig, 905 N. Seventh St., Kansas City.

KENTUCKY: Louisville, June 5-7. Sec., Dr. A. T. McCormack, 620 S. Third St., Louisville.

MAINE: Portland, March 12-13. Sec., Board of Registration of Medicine, Dr. Adam P. Leighton, 192 State St., Portland.

MARYLAND: *Medical.* Baltimore, June 18-21. Sec., Dr. John T. O'Mara, 1215 Cathedral St., Baltimore. *Homeopathic.* Baltimore, June 18-19. Sec., Dr. John A. Evans, 612 W. 40th St., Baltimore.

MASSACHUSETTS: Boston, March 12-14. Sec., Board of Registration in Medicine, Dr. Stephen Rushmore, 413-F State House, Boston.

MICHIGAN: Ann Arbor and Detroit, June 12-14. Sec., Dr. J. Earl McIntyre, 202-4 Hollister Bldg., Lansing.

MINNESOTA: *Basic Science.* Minneapolis, April 2-3. Sec., Dr. J. Charnley McKinley, University of Minnesota, 126 Millard Hall, Minneapolis. *Medical.* Minneapolis, April 16-18. Sec., Dr. Julian F. Du Bois, 350 St. Peter St., St. Paul.

MISSISSIPPI: Jackson, June. Asst. Sec.. Dr. R. N. Whitfield, Jackson.

MONTANA: *Reciprocity.* Helena, April 1. *Examination.* Helena, April 2-3. Sec., Dr. S. A. Cooney, 216 Power Block, Helena.

NEBRASKA: *Basic Science.* Omaha, May 7-8. Dir., Bureau of Examining Boards, Mrs. Clark Perkins, 1009 State Capitol Bldg., Lincoln.

NEVADA: *Reciprocity with oral examination.* Carson City, May 6. Sec., Dr. Frederick M. Anderson, 215 North Carson St., Carson City.

NEW HAMPSHIRE: Concord, March 14-15. Sec., Dr. T. P. Burroughs, State House, Concord.

NEW JERSEY: Trenton, June 18-19. Sec., Dr. Earl S. Hallinger, 28 W. State St., Trenton.

NEW MEXICO: Santa Fe, April 8-9. Sec., Dr. Le Grand Ward, 135 Sena Plaza, Santa Fe.

NORTH DAKOTA: Grand Forks, July 2-5. Sec., Dr. G. M. Williamson, 4½ S. Third St., Grand Forks.

OHIO: *Reciprocity.* Columbus, April 2. Sec., Dr. H. M. Platter, 21 W. Broad St., Columbus.

OKLAHOMA: *Basic Science.* Oklahoma City, May 9. *Medical.* Oklahoma City, June 5-6. Sec., Dr. James D. Osborn Jr., Frederick.

OREGON: *Basic Science.* Corvallis, July 6. Sec., State Board of Higher Education, Mr. Charles D. Byrne, University of Oregon, Eugene.

PUERTO RICO: Santurce, March 5. Sec., Dr. O. Costa Mandry, Box 3854, Santurce.

RHODE ISLAND: Providence, April 4-5. Sec., Dr. Robert M. Lord, 366 State Office Bldg., Providence.

SOUTH DAKOTA: Rapid City, July 16-17. Dir., Medical Licensure, Dr. J. F. D. Cook, Pierre.

TEXAS: San Antonio, June 20-22. Sec., Dr. T. J. Crowe, 918-20 Mercantile Bldg., Dallas.

VIRGINIA: Richmond, June 18-20. Sec., Dr. J. W. Preston, 30½ Franklin Rd., Roanoke.

WEST VIRGINIA: Charleston, March 4-6. Sec., Public Health Council, Dr. Arthur E. McClue, State Capitol, Charleston.

WISCONSIN: *Basic Science.* Madison, April 6. Sec., Professor Robert N. Bauer, 3414 W. Wisconsin Ave., Milwaukee. *Medical.* Milwaukee, June 25-28. Sec., Dr. E. C. Murphy, 314 E. Grand Ave., Eau Claire.

Book Notices

Supervision in Public Health Nursing. By Violet H. Hodgson, Supervisor, Outpatient Tuberculosis Nursing, New York State Department of Health. Cloth. Price, $2.50. Pp. 376, with 21 illustrations. New York: Commonwealth Fund; London: Oxford University Press, 1939.

Every public health nurse should read Violet Hodgson's new book and for every supervisor or administrator concerned with public health nursing the book is an essential. The basic theme underlying this work is that successful supervision is based on democratic principles and that the exercise of arbitrary authority fails to secure the best performance from the staff nurse. One would hardly venture to disagree with this principle: it is idealistic and in keeping with our national philosophy. Yet we owe, in modern nursing, much to the traditional military system of organization, which has given us an understanding of the importance of clear lines of responsibility and authority. In stating the ideal democratic basis for supervision in public health nursing Mrs. Hodgson has perhaps overstressed its case. The two chapters dealing with the teaching function of the supervisor are excellent and give a proper emphasis to this phase of the supervisor's work; it was particularly wise to include here the laws of learning. In a book written for specialists who are expected to have a background in their field, one would not expect to find quite so much detailed description of historical developments. However, this is not a weakness in the book—it is merely time consuming for the reader, who will most likely be a busy supervisor or other professional worker. Since, as the author points out, there has been a great increase of public health nursing under official auspices, one could expect greater space and emphasis given to supervision under conditions found in public agencies. Civil service and problems of supervision connected with it are not discussed at all. This is a real and unfortunate omission. The book is the most authoritative word on its subject. It deserves, and will receive, wide attention and it undoubtedly will become an influential factor in shaping relationships and directions taken in public health nursing agencies throughout the land.

The Diagnosis and Treatment of Diseases of the Esophagus. By Porter P. Vinson, B.S., M.A., M.D., Professor of Bronchoscopy, Esophagoscopy and Gastroscopy, Medical College of Virginia, Richmond, Virginia. Cloth. Price, $4. Pp. 224, with 98 illustrations. Springfield, Illinois, & Baltimore: Charles C. Thomas, Publisher, 1940.

This is a good book and a much needed one. For years most patients with diseases of the esophagus have been receiving poor treatment largely because there are so few men in the world who have enough material of this one type to become expert in diagnosis and treatment. Unfortunately also, for some curious reason, some of the men who have written the few available books and articles on the esophagus seem to have been unaware of the fact that in 1898 Russell, of England, devised a simple apparatus by means of which strictures in the esophagus and spasmodic contractures at the cardia can be dilated with a high degree of safety. A recently published book on the esophagus still advocated the retrograde attack on cardiospasm through a fistula in the stomach. As Vinson says (p. 14), gastrostomy is associated with a surprisingly high mortality; it rarely provides grateful palliation in cases of cancer of the cardia and it is quite unnecessary in most of the cases of benign obstruction in esophagus and cardia. Excellent results can be secured without it. Dr. Vinson began writing his book with the tremendous advantage of having had an enormous experience in this field. For years he, Dr. Henry Plummer and Dr. Herman Moersch took care of the patients with esophageal diseases drawn from the huge material seen at Rochester, Minn. Perhaps the commonest of these diseases is cardiospasm, and this can usually be relieved easily by the Russell-Plummer technic. First the patient is made to swallow a thread. This finds its way through the narrow place and passes on down into the small bowel, where it becomes sufficiently anchored so that traction can be made on it. Olive shaped dilators are then passed over the thread and down through the obstruction. After the narrow place has been dilated to size 60 French, the hydrostatic dilator of Russell is brought into play. The preliminary use of the sound so completely eliminates the danger of rupture of the esophagus that in the last 450 cases Vinson has had no death from this cause. Strangely enough, strictures due to carcinoma of the esophagus can also be dilated and with only a small risk. Such dilation gives many patients a large degree of relief. There are several chapters in the book on the rarer diseases of the esophagus, hysterical dysphagia, esophageal diverticula, cicatricial stenoses, foreign bodies, and stricture of the esophagus due to pressure from outside. Vinson states that almost all patients with benign stricture of the esophagus can be relieved completely and permanently of difficulty in swallowing if the treatment which he outlines is promptly employed and faithfully carried out. Usually the esophagus has to be dilated at intervals for two years. Gastrostomy rarely has to be done. In the book there are two valuable chapters on the technic of esophagoscopy and on the general handling of patients. This little volume should greatly improve the treatment now being given to patients with esophageal disease throughout the world.

Beiträge zur Frage der normalen Genese der Blutzellen. Die Endstadien der fötalen Erythromyelopoese in Leber und Milz und das Vorkommen von Myelocyten in der normalen Milz und Thymus. Von Arne Bertelsen. Denne Afhandlung er af det lægevidenskabelige Fakultet antaget til offentlig at forsvares for den medicinske Doktorgrad, København, 1938. Paper. Pp. 272, with 36 illustrations. Copenhagen: Levin & Munksgaard; Ejnar Munksgaard, 1938.

The work is a doctor's thesis, which probably accounts for the long and repeated discussions of theories regarding origin and relations of blood cells and for the extensive tabular matter. The book is devoted to the problem of extramedullary erythromyelopoiesis in the spleen, liver and thymus of normal human fetuses of the seventh, eighth and ninth months, the prematurely born, the newly born and the infant, child and adult, with the object of determining the normal limits of extramedullary blood formation in these age groups. The material was by far the most extensive and best controlled of any series used for study of this problem. Trauma in one form or another was the most frequent cause of death. Only cases in which the necropsy revealed no pathologic changes were included in the series regarded as normal. A few pathologic cases were studied for comparison with the corresponding normal age groups. While it is generally conceded that extramedullary myelopoiesis is to be seen in late fetal stages, only a few investigators believe that it extends beyond the newborn under normal conditions. Bertelsen's observations for liver, spleen and thymus are in agreement with those of the latter authors. His proof is submitted in great detail; it includes thirty-six photomicrographs and slightly more than 100 pages of tables in which the number of hematopoietic foci and differential counts of normoblasts and myelocytes seen in a specified number of microscopic fields (Leitz objective 3, ocular 8) of sections are listed. The results are discussed from the standpoint of the leading hematologic theories, with the conclusion that the unitarian theory gives the best explanation of the observations. The literature pertaining to the problem is reviewed critically and in detail.

The liver was studied in twenty-one fetuses of the seventh month, twenty-seven of the eighth month, twenty-two of the ninth month, thirty-two newborn (full term) and two infants 14 days and 6 weeks of age. Seven premature infants and nine malformed fetuses were studied. The author found hematopoietic foci in the connective tissue of the portal canals and in the hepatic trabeculae and sinusoids of the lobules. The majority of intralobular foci are in the sinusoids, but some are located between the liver cells of the trabeculae and show no connections with the sinusoids. These foci are composed of myeloblasts, normoblasts in different stages of development, and a few myelocytes. The extravascular location of many of these foci is not in harmony with the view of Sabin and Doan that erythropoiesis is always intravascular and that the cells originate from endothelium. The author did not see any evidence favoring an endothelial origin of any of the blood cells. Both myelocytes and granulocytes could be traced to the "hemocytoblasts" (myeloblasts), which are most numerous in the fetal stages. Myelocytes are most abundant in the portal foci. While the number of foci is reduced from the seventh fetal month to birth, their size and cellular composition remains constant. All the livers of thirty-two newborn infants contained intralobular hematopoietic centers, and in nine of them there were from twenty-five to eighty-five

such centers for each microscopic field. From this the author concludes that liver hematopoiesis must be more extensive than is shown from his series to be normal before a diagnosis of fetal erythroblastosis or hydrops congenitus is justified. Hepatic foci were still present in the two weeks and six weeks old infants. As normal material from age 6 weeks to 3 years was not available, it was impossible to determine the age at which liver hematopoiesis terminates. It was not seen in normal children and adults. Intralobular hematopoiesis was reduced in the seven premature infants studied, but the portal foci were large and the number of their myelocytes increased. Extra-uterine life, therefore, seems to suppress intralobular erythropoiesis and to favor myelopoiesis in the portal tissue. Local intravascular development of myelocytes was noted in the fetal livers, and in these livers the extravascular erythropoietic centers were most numerous, which favors the Mollier view that hematopoiesis in the liver is at first extravascular and later intravascular. Bertelsen could find only an occasional extravascular focus in the liver lobules of the newly born.

All the spleens of the premature and newborn infants of this series showed evidence of myelopoiesis and erythropoiesis in both pulp and follicles. In the pulp the cells were scattered or occurred in small groups, often in the marginal zone of the follicles. From the seventh fetal month to full term birth the normoblasts were reduced from an average of 24 per immersion field to 12, and they and the myelocytes were found in the spleens of all newborn infants. The erythroblasts and myelocytes are in different stages of development and so must be assumed to be of local origin. Eosinophilic myelocytes were found in all of forty-one spleens in cases of traumatic death at ages of from 4 to 89. A few neutrophilic and basophilic myelocytes were also seen, and a few myelocytes were located in the follicles. Erythroblasts were not found in this age group. The granulopoietic function is therefore retained to extreme old age, while the development of red cells terminates soon after birth, although the exact period could not be determined.

Erythroblasts were not seen in the thymus of the adult in a single case. An occasional erythroblastic focus was seen in this organ at the end of fetal life, while only single scattered erythroblasts were observed in the late fetuses. Myelocytes, however, were numerous and were found at all ages as long as the organ persists. Eosinophil myelocytes predominated, as was also true of the spleen. Myelopoiesis is not reduced at the end of fetal life as it is in the other organs showing extramedullary hematopoiesis, and it is more extensive than in the other organs. An occasional myelocyte was found even at age 65. The myelocytes were seen to be in various stages of development and they were associated with large, basophilic hemocytoblasts and so must have been of local origin. The presence of small, dark "trachychromatic" nuclei identical with those of the smaller lymphocytes is interpreted as evidence for the direct origin of some of the myelocytes from lymphocytes. In the fetus the myelocytes are associated with more hemocytoblasts, which are probably derived from the perivascular and septal mesenchyme, than is the case in the adult. A few myelocytes with lymphocytic nuclei were also seen in the fetus. From these observations the author concludes that the thymus continues to function as a granulopoietic organ and that in the adult the myelocytes are derived largely from lymphocytes, and in the fetus from both lymphocytes and mesenchyme.

Failure of the Circulation. By Tinsley Randolph Harrison, M.D., Associate Professor of Medicine, Vanderbilt University School of Medicine, Nashville, Tennessee. Second edition. Cloth. Price, $4.50. Pp. 502, with 61 illustrations. Baltimore: Williams & Wilkins Company, 1939.

This edition is considerably longer than the initial one chiefly because it includes an extensive section on angina pectoris covering about seventy pages. The author emphasizes the importance of sudden death when the myocardium is in need of oxygen. He refers to experimental work of several authors regarding the production of ventricular fibrillation by anoxia. Harrison condemns such diagnoses as pseudo-angina. In the remainder of the book the general pattern of the first edition is followed. Much of the material comes from earlier papers of the author and his associates. This section contains sound descriptions of the origin of the cardinal symptoms of congestive heart failure, dyspnea and edema. Harrison champions the "backward failure" theory advanced by James Hope a century ago. The evidence presented seems to justify this contention. The entire book is well documented with more recent references. There is an index. The chief merit of both editions is the application of physiologic observations to clinical practice. Repeatedly the author brings up minor points in treatment which are logical outgrowths of experimental work. This "physiologic" attitude toward the care of patients makes the book desirable reading for all students specializing in diagnostic or cardiac work. The volume would help the preparation for examination by the American Board of Internal Medicine. It will find application as supplementary reading for students in physiology. Its general utility as a textbook for reference in applied cardiovascular physiology remains preeminent. No physician would fail to learn much by reading it in continuity.

Health Facts for College Students: A Textbook of Individual and Community Health. By Maude Lee Etheredge, M.D., Dr.P.H., Professor of Hygiene and Medical Adviser for Women, University of Illinois, Urbana. With a foreword by Ray Lyman Wilbur, M.D. Third edition. Cloth. Price, $2. Pp. 410, with 65 illustrations. Philadelphia & London: W. B. Saunders Company, 1939.

College students as well as others are being constantly bombarded, through newspapers, moving pictures and general conversation, with medical propaganda and advice concerning diet and other facts about health. Hence it seems important that they be supplied with simple and authoritative material on personal and public health. This book is not meant to be a work of a highly technical nature. Rather it is designed to furnish health facts to college students so that they may maintain the highest degree of efficiency and physical and mental hygiene. It is easily read and includes just enough technical material so that the college student will understand the purpose of the author. The illustrations are easily understood. There are included chapters on alcohol and its relation to the nervous system, smoking, narcotics, heredity, friendship and marriage, allergy and mental health and hygiene. The book can be recommended for college students and should help them in deriving important facts concerning health.

Proctoscopic Examination and Diagnosis and Treatment of Diarrheas. By M. H. Streicher, M.S., M.D., Assistant Professor of Medicine, University of Illinois College of Medicine, Chicago. Cloth. Price, $3. Pp. 149, with 39 illustrations. Springfield, Illinois, & Baltimore: Charles C. Thomas, 1940.

Part I gives a clear, concise and well illustrated method for the performance of proctoscopic examination. It is based on the author's large experience in this field and offers many practical suggestions which will facilitate the examination. Part II includes a classification of diarrheas from the etiologic standpoint and a brief discussion of treatment. The author has attempted to cover too much ground in too short a space. The classification, treatment and references are incomplete, so that the second portion of the book suffers by comparison with the first portion.

The Essentials of Medical Treatment. By David Murray Lyon, M.D., D.Sc., F.R.C.P., Professor of Clinical Medicine, The University, Edinburgh. Cloth. Price, 15s. Pp. 448, with 19 illustrations. Edinburgh & London: Oliver & Boyd, 1939.

In the preface to this new book from the Edinburgh school it is stated that the author's primary object has been "to survey the whole range of therapeutic measures, and demonstrate the full resources of modern medicine." Unfortunately it does not seem that these objectives have been fully attained. A considerable amount of information regarding approximately 120 disease states is conveyed, but the recitative manner of its delivery is so redolent of the old style of didactic clinical lecture that one is taken back most unpleasantly to the lecture amphitheater, now happily passé in most leading American schools. The book reads pleasantly—some of the old clinical lectures were delightful to listen to—but the pages do not spring to life and offer help to one who consults them, as those of a textbook of therapeutics might reasonably be asked to do. So thoroughly detached indeed is the entire work that the reviewer failed to find (others with greater diligence might succeed) a single instance in which the experience of the author or some other doctor or group of doctors is specifically referred to. Thus of course there can be no bibliography. The index seems to be adequate.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Privileged Communications: Privilege Once Waived Ceases to Exist.—The insured instituted three separate suits in the circuit court of St. Louis, Missouri, against the Metropolitan Life Insurance Company, apparently to collect certain benefits allegedly due him under an insurance policy. All three suits involved substantially the same issues. One suit was tried and was pending on appeal. The others were pending in the trial court. For use in the pending suits, the Metropolitan Life Insurance Company sought to obtain the deposition of a Denver physician. A commission was duly appointed in Denver but the physician refused to testify, relying on the protection of a statute making communications between physicians and patients privileged. The insurance company then petitioned the Denver district court for a subpoena requiring the physician to testify and to produce certain books, records and memoranda. The court sustained the refusal of the physician to testify and discharged him from the order to show cause why he should not be held guilty of contempt. The Supreme Court of Colorado was then asked by the insurer to pass on the question.

The testimony sought from the physician related primarily to hospital records showing the illness of the insured during the years 1925 to 1927 in a Denver hospital. The only question before the Colorado court was whether the privilege had been waived. In determining this question, said the court, the law of the forum governs, that is, the law of the state in which the suits on the insurance policy were pending, Missouri. In the suit that had already been tried in Missouri the insured, without objection, permitted two physicians employed at the Denver hospital during the years involved, 1925 to 1927, to testify about his illness. In the opinion of the Supreme Court of Colorado, this constituted a waiver of the privilege as applied to the testimony sought in the present proceedings. The purpose of the privilege, the court pointed out, is "to encourage confidence and to preserve it inviolate." When the patient permits, without objection, the confidential information to become public at a public trial, the reason for the privilege ceases to exist. Moreover, under the Missouri authorities, a waiver of privilege established through the testimony of one physician extends to all who have attended the patient for the same ailment, regardless of the time of such consultations, attendance or treatments. The privilege once waived ceases to exist, and when a waiver of privilege is once made it is general and not special and its effect cannot properly be limited to a particular purpose or a particular person. The trial court, therefore, should have required the physician to appear before it and to testify. The judgment of the trial court was therefore reversed and the cause remanded with directions to proceed in accordance with the views expressed by the Supreme Court.—*Metropolitan Life Ins. Co. v. Kaufman (Colo.), 87 P. (2d) 758.*

Medical Practice Acts: Scope of Chiropractic in Iowa.—A licensed Iowa chiropractor, the defendant in this case, was enjoined by the Supreme Court of Iowa from practicing physical therapy and electrotherapy, from administering colonic irrigations and from prescribing diets. *State* v. *Boston*, 278 N. W. 291 (abstr. J. A. M. A. **111**:1592 [Oct. 22] 1938). A rehearing was granted the defendant by the Supreme Court and a supplemental opinion rendered.

Section 2555 of the Iowa Code defines chiropractors as:

> Persons who treat human ailments by the adjustment by hand of the articulations of the spine or by other incidental adjustments.

Section 2559 of the Code provides that a license to practice chiropractic shall not authorize the licensee to practice operative surgery or osteopathy, or to administer or prescribe any drug or medicine included in materia medica. The defendant chiropractor argued that the laws of Iowa make a chiropractor a member of the healing professions, with authority to use any agency in healing the sick except those agencies the use of which is expressly prohibited. But, said the Supreme Court in this supplemental opinion, the practice of medicine and surgery is the practice of the healing art, and, unless restrictions be placed thereon by the legislature, the whole field of medicine and surgery is open to the practitioner. On the other hand, the practice of chiropractic, although recognized as a branch of the healing art, is only one form of the practice, within well defined limits, of the science of healing as such practice is defined by section 2555 of the Code. The legislature has prescribed, the court said, the method of healing which may be used by chiropractors and has further specified, by section 2559, other methods which may not be used. If section 2559 broadened the field in which the chiropractor may practice, the court continued, and if he has the right to go outside the restrictions and employ other methods not therein prohibited, then the whole field of medical science is open to him except as prohibited in that section. The court expressed belief that the practice of medicine and surgery includes physical therapy, electrotherapy, colonic irrigations and the prescribing of diet and that therefore chiropractors may not lawfully employ such modalities.

The defendant urged that the ruling of the court would bar the use of mechanical appliances or common instruments by barbers and others. The classes mentioned, the court pointed out, are not engaged in the practice of medicine or of healing nor are they holding themselves out to the public as healers. The reason for all laws restricting the activities of professions is the protection of the public, and the legislature has seen fit to enact laws governing the practice of the various forms of the art of healing, permitting each practitioner to follow his profession according to its established principles. Those persons who are authorized to practice one form of the art may not encroach on another form for which they have no authority from the state.

The Supreme Court, therefore, adhered to its former decision in this case.—*State v. Boston (Iowa), 284 N. W. 143.*

Society Proceedings

COMING MEETINGS

Academy of Physical Medicine, Richmond, Va., Apr. 24-26. Dr. Herman A. Osgood, 144 Commonwealth Ave., Boston, Secretary.

Alabama, Medical Association of the State of, Birmingham, Apr. 16-18. Dr. D. L. Cannon, 519 Dexter Ave., Montgomery, Secretary.

American Association for the Study of Goiter, Rochester, Minn., Apr. 15-17. Dr. W. Blair Mosser, 133 Biddle St., Kane, Pa., Secretary.

American Association of Anatomists, Louisville, Ky., Mar. 20-22. Dr. E. R. Clark, Dept. of Anatomy, Univ. of Pennsylvania School of Medicine, Philadelphia, Secretary.

American Association of Pathologists and Bacteriologists, Pittsburgh, Mar. 21-22. Dr. Howard T. Karsner, 2085 Adelbert Rd., Cleveland, Secretary.

American College of Physicians, Cleveland, Apr. 1-5. Mr. E. R. Loveland, 4200 Pine St., Philadelphia, Executive Secretary.

American Physiological Society, New Orleans, March 13-16. Dr. Philip Bard, Johns Hopkins Medical School, Baltimore, Secretary.

American Society for Experimental Pathology, New Orleans, March 13-16. Dr. Paul R. Cannon, Dept. of Pathology, University of Chicago, Chicago, Secretary.

American Society for Pharmacology and Experimental Therapeutics, New Orleans, March 13-16. Dr. G. Philip Grabfield, 319 Longwood Ave., Boston, Secretary.

American Society of Biological Chemists, New Orleans, Apr. 13-17. Dr. C. G. King, Dept. of Chemistry, Univ. of Pittsburgh, Pittsburgh, Secretary.

Arizona State Medical Association, Tucson, Apr. 18-20. Dr. Leslie R. Kober, 15 East Monroe St., Phoenix, Secretary.

Arkansas Medical Society, Fort Smith, Apr. 15-17. Dr. W. R. Brooksher, 602 Garrison Ave., Fort Smith, Secretary.

Federation of American Societies for Experimental Biology, New Orleans, Mar. 13-16. Dr. D. R. Hooker, 19 West Chase St., Baltimore, Secretary.

Georgia, Medical Association of, Savannah, Apr. 23-26. Dr. Edgar D. Shanks, 478 Peachtree St. N.E., Atlanta, Secretary.

Louisiana State Medical Society, New Orleans, Apr. 22-24. Dr. P. T. Talbot, 1430 Tulane Ave., New Orleans, Secretary.

Maryland, Medical and Chirurgical Faculty of, Baltimore, Apr. 23-24. Dr. Richard T. Shackelford, 1211 Cathedral St., Baltimore, Secretary.

Minnesota State Medical Association, Rochester, Apr. 22-24. Dr. B. B. Souster, 493 Lowry Medical Arts Building, St. Paul, Secretary.

Nebraska State Medical Association, Omaha, Apr. 22-25. Dr. R. B. Adams, 416 Federal Securities Building, Lincoln, Secretary.

Northern Tri-State Medical Association, Battle Creek, Mich., Apr. 9. Dr. E. Benjamin Gillette, 320 Michigan St., Toledo, Ohio, Secretary.

Pacific Coast Surgical Association, Portland, Ore., Apr. 3-6. Dr. H. Glenn Bell, University of California Hospital, San Francisco, Secretary.

Southeastern Surgical Congress, Birmingham, Ala., Mar. 11-13. Dr. Benjamin T. Beasley, 701 Hurt Building, Atlanta, Ga., Secretary.

Tennessee State Medical Association, Chattanooga, Apr. 9-11. Dr. H. H. Shoulders, 706 Church St., Nashville, Secretary.

Current Medical Literature

AMERICAN

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Titles marked with an asterisk (*) are abstracted below.

American Journal of Diseases of Children, Chicago

59: 1-218 (Jan.) 1940

*Treatment of Pneumococcic Infections in Children with Sulfapyridine. H. S. Christian, G. M. Jorgensen and Catherine Ellis, New York.—p. 1.

Dietary and Metabolic Studies of Eskimo Children With and Without Dental Caries, Including Studies of Metabolic Balances of Calcium, Phosphorus and Nitrogen. E. H. Siegel, L. M. Waugh and M. Karshan, with technical assistance of Clare Lowenberg and Mary Segall, New York.—p. 19.

Biochemical Studies of Saliva of Eskimos Correlated with Dental Caries and Occurrence of Salivary Calculus. M. Karshan, E. H. Siegel and L. M. Waugh, with technical assistance of Mary Segall, New York.—p. 39.

Study of Feet of Infants and Children. A. Bloxsom, Houston, Texas.—p. 45.

Weltmann Reaction and Sedimentation Rate During Rheumatic Fever of Childhood. R. I. Klein, S. A. Levinson and P. Rosenblum, Chicago.—p. 48.

*Treatment of Impetigo Contagiosa with Rubber Containing 8-Hydroxyquinoline. M. Seldowitz, Brooklyn.—p. 67.

Modification of Smallpox Vaccination in Susceptible Infants: Use of Specific Convalescent Serum. J. Greengard and A. M. Wolf, Chicago.—p. 76.

*Pneumococcic Pneumonia of Type XIV in Children Treated with Specific Serum. J. G. M. Bullowa and M. Gleich, New York, with assistance, in the statistical study, of J. J. Cohen and Constance Lebair.—p. 84.

Attempts to Enhance Virulence of Haemophilus Pertussis by Serial Passage in Guinea Pigs. J. A. Toomey and W. S. Takacs, Cleveland.—p. 94.

Glutathione and Red Cells in Blood in Infancy and in Childhood. Helen McNamara and M. J. E. Senn, New York.—p. 97.

Growth and Chemical Composition of Human Skeleton. W. W. Swanson and V. Iob, Chicago.—p. 107.

Growth, Development and Care of the Child. H. Bakwin and Ruth Morris Bakwin, New York.—p. 112.

Lipodystrophy: Report of Case, with Metabolic Studies. J. S. Harris and R. Reiser, Durham, N. C.—p. 143.

Sulfapyridine in Pneumococcic Infections of Children.—During a seven months period, Christian and his associates treated 140 children with pneumococcic infections by means of sulfapyridine. Two hundred mg. of the drug per kilogram of body weight was given in divided doses during the first day and 100 mg. per kilogram a day thereafter. Except to a few of the older children, who preferred to swallow the tablets whole, the drug was administered by crushing the tablets and suspending the powder in a small amount of water, milk, fruit juice or honey. When vomiting occurred within an hour after a regular dose, the dose was repeated. One hundred patients had pneumococcic pneumonia. Seven of the 100 patients had otitis media with a purulent discharge from one or both ears, and a number of others had otitis media without rupture of the tympanic membranes. All had pneumococci in their upper respiratory passages and all had x-ray changes consistent with pneumonia. The blood for culture was taken from all patients, usually on admission and in many cases also just before treatment was started. Only four children had positive blood cultures. Twenty-seven per cent of the children were under 1 year of age, and 45 per cent were under 2 years. Discussing the mortality and complications, the authors say that one infant, who had mongolism and congenital heart disease, died after four days of treatment. Two patients had otitis media after administration of sulfapyridine was stopped, but on further treatment their ears improved without rupture of the tympanic membranes. Although 73 per cent of the patients vomited during treatment, only 57 per cent vomited more than once, and in a few cases vomiting was as severe before treatment was started as during it. Cyanosis has not been easy to evaluate because several of the patients were cyanotic at the time treatment was started. The cyanosis of some patients seemed to be definitely due to the drug. Further, the authors discuss the use of sulfapyridine in pneumococcic disorders other than pneumonia. Of four patients who had early pneumococcic empyema, two who had received serum recovered with sulfapyridine therapy; the other two required rib resection in spite of treatment with sulfapyridine. Seventeen children with acute pneumococcic otitis media were treated with sulfapyridine. The average duration of the otitis media at the time treatment was started was four days and the longest duration was eighteen days. Other pneumococcic infections treated with sulfapyridine were primary pneumococcic peritonitis, osteomyelitis, meningitis, laryngotracheobronchitis, infections of the respiratory tracts without roentgenologic signs of pneumonia and pneumococcic wound infection. Five patients with nephrosis and one with asthma who were known to have been carriers of pneumococci were treated and in five cases the therapy was successful within two weeks. Some of the limitations of sulfapyridine were demonstrated in the two cases of pneumococcic meningitis in which death occurred and in a case of pneumonia in which bacteremia persisted during five days of treatment before antipneumococcus serum was given. Studies on absorption and excretion of sulfapyridine are presented and the authors direct attention to the occasional need for a preparation of sulfapyridine which can be given parenterally.

Impetigo Contagiosa.—According to Seldowitz, it has been demonstrated by Kahn and Carroll that rubber containing 8-hydroxyquinoline exhibits certain bacteriostatic properties, particularly in reference to the staphylococcus. In view of the bacteriostatic properties of this rubber base combination, it occurred to the author that the material might find therapeutic application in cases of certain types of pyogenic infections, mainly impetigo contagiosa. A study was made of its effect on thirty-eight children suffering from this infection. The children were divided into two groups. The first included those showing the bullous type of lesion, which was more common in young infants; the second group embraced those presenting the confluent, crusted type of lesion, which occurred more commonly in older children. The group with bullous lesions consisted of eleven patients. In the second group, those with crusted lesions, the infection often began with a small erythematous macule which rapidly developed into a flat pustular vesicle, and this was rapidly transformed into a dry crust resting on an inflamed base. Frequently a seropurulent discharge oozed from beneath the margins of the crust. In applying the rubber base substance, care was taken not to disturb the crusts mechanically. The importance of this has been strongly emphasized by Newman. The lesions were covered with a thin layer of gauze, and the rubber was applied over the gauze. The dressings were held in situ with adhesive plaster and were changed at intervals of from two to four days. The gauze was employed to absorb any secretions which might accumulate beneath the rubber, such as those resulting from liquefaction of the crust or from actual exudation from the lesion itself. The medicated rubber was found to operate as efficiently through the layers of gauze as when placed directly over the lesions. Some of the patients were treated at once with the medicated rubber. For control purposes others were subjected to a preliminary period of treatment with various agents. Summarizing the results of his treatment, the author says that thirty-five of thirty-eight patients were successfully treated with rubber containing 8-hydroxyquinoline. The average time for the disappearance of the crusts was three days. The skin returned to a normal appearance in an average of eight days. The lesions in three of the thirty-eight cases were refractory to this form of therapy.

Specific Serum in Children with Pneumococcic Pneumonia of Type XIV.—According to Bullowa and Gleich, the acceptance of serum therapy for children with pneumonia has been slow. Because of skepticism, the alternation of specific serum therapy was continued at the authors' hospital until evidence of its value was available in an adequate series of cases. Their observations have extended over ten years. Serum was administered when available to alternate patients. Except in nine cases the serum was administered intramuscularly, usually into the upper outer quadrant of the buttock, and the area was massaged for five minutes. After describing the determination of the type of pneumococcus the authors say that pneumococcus type XIV was found in 16.8 per cent of the cases. Its frequency

varies from time to time. From 1929 to 1936 an average of from twenty-two to twenty-three cases were observed each year. In the season 1937-1938, forty-nine cases were observed. Intramuscular injection of serum (followed by massage) was used in sixty-two cases; nine patients received serum intravenously, and three of them died. Twenty patients were treated with rabbit serum and two with horse and rabbit serum in the last two years and four months; all recovered. The dose was about the same in all cases, being from 50,000 to 150,000 units. The death rate in the entire series of cases in which serum was not used was 14.4 per cent. With serum the mortality was 4.2 per cent, a reduction of 70 per cent. The authors reach the conclusion that pneumococcus type XIV is the organism most frequently found in infants and very young children with pneumonia. The mortality is higher before the age of 3 years than after this age. With the use of specific serum in adequate amounts, fewer patients die, more patients with bacteremia recover, the disease is shortened and complications are fewer.

American Journal of Pathology, Boston

15: 657-818 (Nov.) 1939

Toxoplasmic Encephalomyelitis: III. New Case of Granulomatous Encephalomyelitis Due to a Protozoon. A. Wolf, D. Cowen and B. H. Paige, New York.—p. 657.
Experimental Production of Endocarditis Lenta. W. J. MacNeal, Martha Jane Spence and Marie Wasseen, New York.—p. 695.
Study of Histologic Changes and Transplantation of Tissue Surrounding Methylcholanthrene Pellets During Latent Period of Tumor Development in Female CaH Mice. H. L. Stewart, Cambridge, Mass.—p. 707.
Studies on Experimental Rickets in Rats: III. Behavior and Fate of Cartilage Remnants in Rachitic Metaphysis. G. S. Dodds and Hazel C. Cameron, Morgantown, W. Va.—p. 723.
Essential and Paroxysmal Hypertension, Contrasted by Case Reports. F. H. Foucar, Washington, D. C.—p. 741.
Iron Hematoxylins Containing Ferric and Ferrous Iron. R. D. Lillie and W. R. Earle, Washington, D. C.—p. 765.
Effect of Yeast on Incidence of Cirrhosis Produced by Lead Arsenate. W. C. VonGlahn and F. B. Flinn, New York.—p. 771.
Primary Chorionepithelioma of Urinary Bladder in Male: Report of Case. T. Weinberg, New York.—p. 783.

Annals of Otol., Rhinol. and Laryngology, St. Louis

48: 873-1152 (Dec.) 1939

Epidermoid Carcinoma of Pharynx, Buccal Mucosa and Larynx. D. M. Lierle, Iowa City.—p. 875.
Severe Injury to Larynx Resulting from Indwelling Duodenal Tube: Case Reports. S. Iglauer, Cincinnati, and W. F. Molt, Indianapolis.—p. 886.
Sepsis Following Pharyngeal Infections. C. Hall, Los Angeles.—p. 905.
*Indications for Direct Laryngoscopy. C. L. Jackson, Philadelphia.—p. 926.
Experimental Studies on Enchondral Bone of Otic Capsule. W. P. Covell, San Francisco.—p. 934.
Deep Neck Infection. A. L. Beck, New Rochelle, N. Y.—p. 940.
Cerebral Edema as Cause of Intracranial Hypertension of Otitic Origin. N. A. Levy, Chicago.—p. 999.
Irrigation of Maxillary Sinus Through Ostium: Clinical Study of 500 Cases. F. W. Merica, Lakewood, Ohio.—p. 1011.
Testing of Transmission Apparatus with Bone Conduction Receiver. J. H. Hůlka, Long Island City, N. Y.—p. 1020.

Indications for Direct Laryngoscopy. — According to Jackson, direct laryngoscopy provides the only means of examining the larynx of infants and young children and is indicated in the presence of any symptom referable to the larynx in a child. Obstructive laryngeal dyspnea, stridor, wheezing, hoarseness or aphonia call for direct laryngoscopy as the most important diagnostic procedure and often the only means of treatment. Direct laryngoscopy has shown that the most common cause of stridor in infancy is congenital deformity of the epiglottis and supraglottic aperture. The condition is rarely serious and is generally outgrown during the second year of life without treatment. However, it is extremely important to diagnose it and to exclude other conditions which do require treatment and may prove fatal if not treated; for example, congenital subglottic webs, papillomas, bilateral abductor paralysis or dislocation of the arytenoids can be diagnosed accurately only by direct laryngoscopy. Obviously, a foreign body in the larynx of a child, as in an adult, constitutes an indication for direct laryngoscopic removal. In neonatal asphyxia, direct laryngoscopy should always be done for aspiration of laryngeal and tracheal secretions and to exclude high obstruction as a cause. Adult patients requiring direct laryngoscopy may be divided into two classes: those in which the larynx is imperfectly visualized by the laryngeal mirror and those in which the larynx is well visualized by the mirror but some condition is revealed which calls for instrumental manipulation, such as biopsy, the removal of a benign tumor or dilation. An overhanging or deformed epiglottis is the most common cause of difficult visualization by the indirect method, though some other anatomic condition or an exceptionally intolerant throat may be at fault.

Bulletin New York Academy of Medicine, New York

16: 1-50 (Jan.) 1940

The Adrenal Medulla. W. B. Cannon, Boston.—p. 3.
Hypothyroidism: Diagnosis and Treatment. J. H. Means, Boston.—p. 14.
Modern Treatment of Pyogenic Osteomyelitis. D. B. Phemister, Chicago.—p. 20.
Otitis Media and Its Extensions. E. P. Fowler Jr., New York.—p. 24.
Obstetrics at the New York Almshouse and at Bellevue Hospital. C. E. Heaton, New York.—p. 38.

Canadian Medical Association Journal, Montreal

42: 1-108 (Jan.) 1940

Demonstration of Orally Active Medullotrophic Principle in Primary Extract of Pituitary Tissue. J. B. Collip, Montreal.—p. 2.
Chronic Recurrent Ulceration of Leg. S. Gordon, Toronto.—p. 4.
Transverse Incision of Abdomen: Laparotomy Wound of Choice. F. B. Gurd, Montreal.—p. 10.
New Approach to Knee Joint. V. O. Mader, Halifax, N. S.—p. 17.
*Potassium Chlorate in Treatment of Poliomyelitis. J. Saucier and O. W. Stewart, Montreal.—p. 19.
Fatal Case of Accidental Poisoning by Chlorate of Potassium: Review of Literature. W. J. Cochrane and R. P. Smith, Halifax, N. S.—p. 23.
Anuria Caused by Sulfapyridine Therapy: Report of Case Successfully Treated by Operation. E. Smith, K. A. Evelyn and J. F. Nolan, Montreal.—p. 27.
Toxic Effects of Sulfanilamide and Related Compounds. E. H. Bensley, Montreal.—p. 30.
Angina Pectoris: Case Study. E. P. Scarlett, Calgary, Alta.—p. 34.
Compression Fractures of Vertebral Bodies Following Induced and "Idiopathic" Convulsions. G. E. Reed and T. E. Dancey, Montreal.—p. 38.
Treatment of Mental Illnesses with Metrazol: Preliminary Report on Seventy-Six Patients. J. A. Cummins, Hamilton, Ont.—p. 39.
Routine Hearing Tests. D. E. S. Wishart, Toronto.—p. 46.
Maternal Mortality from the Point of View of the Obstetrician. P. A. McLeod, Kingston, Ont.—p. 53.
Psychologic and Medical Aspects of Excessive Use of Alcohol. G. H. Stevenson, London, Ont.—p. 57.
Pollen Disease in Western Canada. C. H. A. Walton, Winnipeg, Man.—p. 62.

Potassium Chlorate and Poliomyelitis. — Experiments performed by Saucier and Stewart, designed to repeat the work reported by Contat, Arthus, Spycher and Debat in which they claimed to have obtained evidence of a specific protective action from potassium chlorate against experimental poliomyelitis in monkeys, show to the contrary that potassium chlorate is of no value against the development or course of experimental poliomyelitis in monkeys.

Connecticut State Medical Society Journal, Hartford

3: 647-710 (Dec.) 1939

The Litchfield County Medical Association and Dr. Elias Pratt. W. R. Steiner, Hartford.—p. 649.
Varieties of Healing Process in Tuberculosis of Spine. P. P. Swett, Hartford.—p. 652.
Rational Therapy. C. H. Wies, New London.—p. 656.
Vaccines of Value. S. S. Chipman, Norwalk.—p. 658.
X-Ray Fallacies. B. M. Parmelee, Bridgeport.—p. 660.
Apical Cavity in Pulmonary Tuberculosis. R. G. Urquhart, Norwich.—p. 663.
Sulfapyridine in Treatment of Pneumonia. F. G. Blake and J. W. Haviland, New Haven.—p. 665.
Horace Wells Conquers Pain: A 95th Anniversary Review. M. E. Soifer, Hartford.—p. 674.
*Clinical Significance of Bleeding of First Trimester of Pregnancy. F. C. LaBrecque, Waterbury.—p. 676.

Bleeding of First Trimester of Pregnancy.—LaBrecque says that examination of the records of 510 patients seen in the antepartum clinic of the Massachusetts Memorial Hospitals reveals that only 17.2 per cent, or only eighty-eight women, saw a physician for the first time during the first trimester of pregnancy. Moreover, 215 patients did not see a physician until the last trimester and twenty-four patients were not seen by a physician until they were at term. Despite the attention focused on antepartum care by the medical and lay press, patients are still seeing their physicians or visiting the maternity clinics much too late in pregnancy. About 40 per cent of all patients during the child bearing age have, at one time or another, bleeding as a complication during the first three months of pregnancy. The

bleeding may be classified as (1) pseudomenstruation, (2) cervical (cervicitis, endocervicitis, erosion, polyp and carcinoma), (3) intra-uterine (abortion and hydatidiform mole) and (4) extra-uterine (ectopic pregnancy). The author concludes that carcinoma of the cervix does occur as a complication early in pregnancy and must be seriously considered when the bleeding is cervical in origin. The medical and lay press must continue education of the public regarding early antepartum care—which means the reporting of the patient to her physician within two weeks of missing a menstrual period. The causes of first trimester bleeding are classified and discussed as to diagnosis and treatment.

Indiana State Medical Assn. Journal, Indianapolis

33: 1-54 (Jan.) 1940

Diagnosis and Treatment of Cardiovascular Emergencies ("Heart Attacks"). P. D. White, Boston.—p. 1.
Diagnosis and Treatment of Peptic Ulcer. R. L. Sensenich, South Bend.—p. 8.
Endotracheal Anesthesia. F. W. Clement, Toledo, Ohio.—p. 13.
Tularemia. R. E. Mitchell, Indianapolis.—p. 16.
Effect of Transportation on Rural Medicine. O. A. Province, Franklin.—p. 19.
Why People Go to Cultists. R. P. Knight, Topeka, Kan.—p. 22.

Journal of Experimental Medicine, New York

71: 1-128 (Jan.) 1940. Partial Index

Chemical Studies on Bacterial Agglutination: Agglutinin and Precipitin Content of Antiserum to Haemophilus Influenzae, Type B. Hattie E. Alexander and M. Heidelberger, New York.—p. 1.
Selective Action of Sulfanilamide on Parasites of Experimental Malaria in Monkeys in Vivo and in Vitro. L. T. Coggeshall, New York.—p. 13.
Permeability of Human Placenta to Antibodies: Quantitative Study. A. S. Wiener and I. J. Silverman, with technical assistance of Eve Sonn, New York.—p. 21.
Soluble Antigen of Lymphocytic Choriomeningitis: II. Characteristics of Antigen and Its Use in Precipitin Reactions. J. E. Smadel, M. J. Wall and R. D. Baird, New York.—p. 43.
Studies on Experimental Hypertension: X. Oxygen Consumption of Ischemic Kidney. C. Gerbi, B. B. Rubenstein and H. Goldblatt, Cleveland.—p. 71.
Cardiac Lesions Resembling Aschoff Bodies in Rabbits. L. Loewe and S. E. Lenke, New York.—p. 89.
Studies on Eastern Equine Encephalomyelitis: IV. Infection in Mouse with Fresh and Fixed Virus. L. S. King, Princeton, N. J.—p. 95.
Id.: V. Histopathology in Mouse. L. S. King, Princeton, N. J.—p. 107.
Studies on Cultivation of Virus of Lymphogranuloma Venereum. M. Sanders, New York.—p. 113.

Journal of Immunology, Baltimore

37: 507-610 (Dec.) 1939

Biologic Reactions of Malignant Neoplasms: I. Reaction to Bacterial Fractions. E. L. Walker and Marion Sweeney Handman, San Francisco.—p. 507.
Mechanism of Toxic Action of Germicides on Whole Blood Measured by Loss of Phagocytic Activity of Leukocytes. H. Welch, Washington, D. C.—p. 525.
*Nature and Significance of Pseudo-Dick Reactions. R. W. Huntington Jr., St. Louis.—p. 535.
Allergy and Desensitization in Experimental Tuberculosis: Effect of Time and Dosage. C. E. Woodruff and H. S. Willis, Northville, Mich.—p. 549.
Protein Fractions of Strain of Group A Hemolytic Streptococci: III. M. Heidelberger and H. W. Scherp, New York.—p. 563.
Comparative Study of Phagocytosis and Digestion of Pneumococci by Macrophages and Polymorphonuclear Leukocytes in Normal and Immune Dogs. O. H. Robertson and Helen Van Sant, with technical assistance of Gladys Peterson, Chicago.—p. 571.

Pseudo-Dick Reactions.—In a search for a substance sufficiently potent to be considered a likely cause of pseudo-Dick reactions, Huntington states that filtrates of cultures of the hemolytic streptococcus contain little streptococcus protein, and the hypothesis which considers such protein a frequent source of pseudo-Dick reactions appears untenable. The activity of a filtrate of a nonscarlatinal streptococcus in the skin did not appear to depend on cellular disintegration and differed in its great heat stability and in other respects from that of preparations of streptococcus protein. No agent could be found, other than scarlatinal toxin, which had the potency necessary to induce reactions to one or two skin test doses of the scarlatinal filtrates used. On the whole, the results tend to suggest that at least in the age group studied (from 6 to 15 years) pseudo-Dick reactions to serum-free filtrate are unusual, and control filtrates heated for two hours at 100 C. should be of value in detecting them when they occur.

Journal-Lancet, Minneapolis

60: 1-44 (Jan.) 1940

Prevention and Treatment of Contagious Diseases: Outline. A. V. Stoesser and Evelyn V. Johnson, Minneapolis.—p. 1.
The Student Health Service Physician. E. L. Shrader, St. Louis.—p. 5.
Thoracic Disease Giving Abdominal Signs and Symptoms. N. O. Brink, Bismarck, N. D.—p. 7.
Juvenile Cirrhosis: Case Report. Ruth C. Foster, Madison, Wis.—p. 11.
Importance of Adequate Scrotal Support: Preliminary Report. J. H. Winer, New York.—p. 13.
*New Type of Calcaneal Spur. J. R. Vasko, Great Falls, Mont.—p. 15.
Tuberculosis Problem in Negro Schools and Colleges. P. B. Cornely, Washington, D. C.—p. 17.
Results of Sulfanilamide Therapy in Treatment of Gonorrhea. W. Wright, Minneapolis.—p. 21.
Some Useful Prescriptions. B. Fantus, Chicago.—p. 25.
Artificial Fever Therapy by Physical Means. A. Stolinsky, Lisbon, N. D.—p. 29.
Treatment of Pneumonia in Children with Sulfapyridine. A. V. Stoesser, Minneapolis.—p. 33.
Prevalence of Vitamin A Deficiencies: Preliminary Report. E. O. Dahl, Minneapolis.—p. 36.

New Type of Calcaneal Spur.—Vasko directs attention to a type of spur formation on the posterior aspect of the os calcis, which to his knowledge has not been described before. He discovered such spurs on the posterior superior aspect of the os calcis at operation on two patients suffering from an achilles bursitis. The clinical aspects were those of an achilles bursitis consisting of swelling, aching, tenderness, and increased local temperature. Pressure of the shoe produced discomfort and walking was painful, especially climbing upward. Conservative treatment consisting of rest, immobilization and physical therapy proved unsuccessful and so after several weeks operative removal of the bursae was done. At operation the author found enlarged edematous bursae as was expected, but after their removal spur formations which were small, rough and sharp were found on the posterior superior aspect of the os calcis. These protruded as much posteriorly as superiorly. Obviously they constituted a rough surface over which the tendon had to slide and which probably caused the bursitis. Whether the spur or the bursitis came first is not known. The first case reported by the author reveals that recovery may occur without removal of the spurs. In this case the heels remained thickened posteriorly but were free from symptoms two years after the operation. In the second case the spurs were chiseled off, but the ultimate result is not known because the patient was not heard from again.

Journal of Nervous and Mental Disease, New York

91: 1-140 (Jan.) 1940

Observations on Behavior of Schizophrenic Patients Undergoing Insulin Shock Therapy. C. Wall, Worcester, Mass.—p. 1.
Pick's Disease: Clinicopathologic Case Reports. S. M. Bouton Jr., Ingleside, Neb.—p. 9.
Grasping and Sucking. I. Bieber, New York.—p. 31.
Clinicopathologic Study of Parenchymatous Cortical Cerebellar Atrophy: Report of Familial Case. R. Richter, Chicago.—p. 37.
Remarks on Myelography. R. Wartenberg, San Francisco.—p. 47.
Cortical Atrophy or Tumor of Brain: Differential Diagnosis. A. Gordon, Philadelphia.—p. 53.

Journal of Nutrition, Philadelphia

18: 537-638 (Dec.) 1939

Use of Isolated Radiation in Experiments with the Rat: II. Effects of Darkness, Visible and Infra-Red Radiation on Three Succeeding Generations of Rats: (*a*) Growth and Storage of Vitamin A. Ethel M. Luce-Clausen and Elizabeth F. Brown, Rochester, N. Y.—p. 537.
Id.: III. Effects of Darkness, Visible and Infra-Red Radiation on Three Succeeding Generations of Rats: (*b*) Reproduction. Ethel M. Luce-Clausen and Elizabeth F. Brown, Rochester, N. Y.—p. 551.
Adaptation to Low Calcium Intake in Reference to Calcium Requirements of Tropical Population. L. Nicholls and A. Nimalasuriya, Colombo, Ceylon.—p. 563.
Role of Antidermatosis Vitamin and New Water-Soluble Growth Factor in Nutrition of Mature Fowl. J. C. Bauernfeind and L. C. Norris, Ithaca, N. Y.—p. 579.
Quantitative Chemical Study of Urinary Excretion of Thiamin by Normal Individuals. D. Melnick, H. Field Jr. and W. D. Robinson, Ann Arbor, Mich.—p. 593.
Isolation of Desired Qualities of Radiant Energy for Biologic Experimentation. L. A. Jones and C. Tuttle, Rochester, N. Y.—p. 611.
*Determination of Ascorbic Acid in Commercial Milks. W. W. Woessner, C. A. Elvehjem and H. A. Schuette, Madison, Wis.—p. 619.

Ascorbic Acid in Commercial Milks.—Woessner and his associates determined the ascorbic acid content of regular commercial samples of milk as related to the quantity present in the milk at the time of milking. They found that samples of raw,

certified, certified Guernsey and certified vitamin D milks are, on the average, only a little below the fresh milks in ascorbic acid content, indicating that commercial raw and certified milks as delivered to the consumer lose only a small amount of their antiscorbutic potency. Likewise, samples of commercial pasteurized milks analyzed on an average contained only about half as much ascorbic acid as fresh raw milks and less ascorbic acid than the commercial unpasteurized milks. In pasteurized and unpasteurized milks the amount of dehydroascorbic acid was less than the ascorbic acid. Commercial pasteurized vitamin D milks in which the potency has been increased by incorporating vitamin D concentrates directly into the milk by homogenization fell below the average value of ordinary pasteurized milks with respect to the ascorbic acid content. On the other hand if the vitamin D content has been increased by feeding the animal irradiated yeast, the antiscorbutic property falls on a par with the average value for commercial pasteurized milks. This would indicate that homogenization tends to destroy ascorbic acid. Mineral modified milk is low in ascorbic acid.

Journal of Pharmacology & Exper. Therap., Baltimore

67: 373-494 (Dec.) 1939

Integration of Vasomotor Responses in Liver with Those in Other Systemic Vessels. L. N. Katz and S. Rodbard, Chicago.—p. 407.
*Effect of Vitamin B_1 on Morphine Abstinence Symptoms. O. G. Fitzhugh, Nashville, Tenn.—p. 423.
Production of Anemia in White Mice by Sulfanilamide, Sulfapyridine and Diaminodiphenylsulfone. A. P. Richardson, Baltimore.—p. 429.
Experimental Basis for Method for Quantitative Evaluation of Effectiveness of Chemotherapeutic Agents Against Streptococcic Infection in Mice. J. T. Litchfield Jr., H. J. White and E. K. Marshall Jr., Baltimore.—p. 437.
Some Aspects of Pharmacology of Sulfapyridine. E. K. Marshall Jr. and J. T. Litchfield Jr., Baltimore.—p. 454.
Detoxication by Finely Dispersed Oil-in-Water Emulsions and Their Intravenous Use. A. C. Frazer and V. G. Walsh, London, England. —p. 476.

Vitamin B_1 and Morphine Abstinence Symptoms.—The idea that morphine may increase the requirement for vitamin B_1, as alcohol does, and that the heightened irritability of the nervous system observed after withdrawal of morphine may be due to a deficiency of vitamin B_1 led Fitzhugh to study the effect of crystalline vitamin B_1 on the morphine abstinence symptoms of albino rats. He found that thiamin (for two days previous to and after withdrawal of morphine) not only decreased the irritability before the permanent withdrawal of morphine but also prevented the usual increase in irritability that follows morphine withdrawal. This effect was not due to any toxic action of the large doses of thiamin chloride used.

Maine Medical Association Journal, Portland

31: 1-34 (Jan.) 1940

*Treatment of Asphyxia Neonatorum. P. J. Flagg, New York.—p. 1.
Pyelitis in Pregnancy. T. M. Stevens, Portland.—p. 18.
Postoperative Infections Following Abdominal Operations. G. A. Tibbetts, Portland.—p. 24.

Treatment of Neonatal Asphyxia.—From a study of the customary treatment of neonatal asphyxia in sixty-three obstetric teaching centers of the United States and Canada, Flagg finds that carbon dioxide with oxygen is in general use, that aspiration is regarded as essential and that the use of heat is frequently overlooked. This should always be applied to protect the baby from exposure. Sharp differences of opinion exist regarding the use of alpha lobeline and other drugs as respiratory stimulants. When intracranial hemorrhage is suspected, lumbar puncture is advocated and the injection of whole blood into the buttocks is recommended. Mouth to mouth insufflation is commonly employed as a method of artificial respiration when mechanical facilities are not available. Intracardiac injections are used as a last resort and are not popular. The use of blind intubation in accordance with the technic of de Lee is common practice in many clinics. The technic of direct laryngoscopy, intubation, suction and insufflation is not generally understood or applied when indicated. Confusion exists as to the sequence in which intracranial hemorrhage occurs; it is claimed as both a cause and a result of asphyxia. The baby that has shown signs of asphyxia should be carefully observed after it is returned to the nursery. The important question of atelectasis is raised and the need of research is indicated. There is a strong sentiment in favor of popularizing to the profession and the public certain general information relative to neonatal asphyxia, with special feeling that frequent sedation administered to the mother is responsible for much of the neonatal asphyxia which is encountered and that the elimination or the reduction of this routine sedation will do much to prevent asphyxia.

Medical Annals of District of Columbia, Washington

8: 345-384 (Dec.) 1939

*Surgical Treatment of Mental Disorders. W. Freeman, Washington.—p. 345.
Significance of Blood Cholesterol Determinations. J. A. Lyon, Washington.—p. 354.
Blood Changes Produced in Rabbits by Indole. W. T. Taylor, Washington.—p. 362.
Proposed Phenolphthalein Test of Gastrointestinal Disease. F. D. Suttenfield, Washington.—p. 363.
Masking Effects of Sulfanilamide on Mastoiditis. D. Davis, Washington. —p. 365.

Surgical Treatment of Mental Disorders.—Freeman and his associate have modified the original Moniz surgical technic for the correction of mental abnormalities. Freeman finds that prefrontal lobotomy, carried out surgically, produces a certain change in the personality of the individual, characterized by a reorientation in the direction of extroversion and a reduction in introversion. It eliminates obsessive thinking, it reduces self consciousness and it promotes satisfaction with self and surroundings. Fear of the future is no longer present. Following operation the patient behaves differently; his behavior seems to depend to some extent on his original makeup and to some extent on the amount of frontal lobe that is still in connection with the rest of the brain. The most satisfactory results from the operation are achieved in the obsessive-compulsive neuroses and in the involutional depressions with agitation. The results in chronic alcoholism have been negligible and those in the schizophrenias are still under consideration. Prefrontal lobotomy seems to offer something of value in the relief of intractable neuroses and psychoses.

Radiology, Syracuse, N. Y.

33: 681-808 (Dec.) 1939

Clinical and Neurologic Aspects of Low Back and Sciatic Pain. M. N. Walsh, Rochester, Minn.—p. 681.
Significant Skeletal Changes in Low Back and Sciatic Pain: Roentgenologic Observations. R. S. Bromer, Bryn Mawr, Pa.—p. 688.
Air Myelography in Diagnosis of Intraspinal Lesions Producing Low Back and Sciatic Pain. W. E. Chamberlain and B. R. Young, Philadelphia.—p. 695.
Intraspinal Lesions Associated with Low Back Pain and Sciatic Pain, and Their Localization by Means of Lipiodol Within Subarachnoid Space. J. D. Camp and E. A. Addington, Rochester, Minn.—p. 701.
Evaluation of Various Diagnostic Procedures Used in Study of Breast, with Particular Reference to Roentgenographic Examination. H. B. Hunt and N. F. Hicken, Omaha.—p. 712.
Relation of Ovarian Hormones to Benign Breast Hyperplasia and Neoplasia. M. Friedman, New York and Newark, N. J.; Rita Finkler and W. Antopol, Newark, N. J.—p. 725.
Carcinoma of Breast, with Consideration of Whole Organ Section Studies. E. R. Whitmore, Washington, D. C.—p. 737.
Visceroptosis During Artificial Pneumoperitoneum Treatment. A. L. Banyai, Wauwatosa, Wis.—p. 751.
Practical Considerations in Comparison of Depth Doses Achieved by 1,000 and 200 Kilovolt X-Ray Apparatus. P. C. Aebersold and M A. Chaffee, San Francisco.—p. 759.

Virginia Medical Monthly, Richmond

67: 1-66 (Jan.) 1940

Differential Diagnosis of Jaundice. F. M. Hanger Jr., New York.—p. 1.
Present Status of Our Knowledge Concerning Pituitary Disease. J. M. Meredith, University.—p. 7.
Medical Aspects of Acute Pyelitis. N. Bloom, Richmond.—p. 18.
Treatment of Pyelitis. C. M. Nelson, Richmond.—p. 20.
Incidence of Cervical Pain Associated with Renal or Ureteral Calculi. S. D. Failla and G. A. Watson, Durham, N. C.—p. 23.
The Female Climacteric. E. C. Hamblen, Durham, N. C.—p. 24.
Ulcers of Pyloric Sphincter, with Case Reports. G. W. Horsley, Richmond.—p. 29.
Recent Developments in Gynecologic Endocrinology. J. A. Hepp, Pittsburgh.—p. 33.
Placenta Accreta: Brief Survey of Literature, with Report of Case. J. H. Meyer and J. W. Ashworth Jr., Baltimore.—p. 36.
Treatment of Gonorrhea in the Male with Sulfanilamide and Urethral Injections of Acriflavine. W. M. Brunet, C. H. Reinhardt and N. D. Shaw, Chicago.—p. 40.
Eugenic Sterilization of the Epileptic and the Mentally Deficient. G. B. Arnold, Colony.—p. 45.
Ectopic Pregnancy: Report of Fifty-Six Patients. R. L. Pearse, Durham, N. C.—p. 48.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Journal of Urology, London

11: 305-410 (Dec.) 1939

*Observations on Healing of Renal Tuberculosis. R. Reid.—p. 305.
Prostigmine as Aid in Expulsion of Ureteral Calculi. V. J. O'Conor.—p. 325.
Episodes in Genito-Urinary Tuberculosis. T. Moore.—p. 332.
Tumors of Testicle: Report of Some Unusual Cases. M. B. Wesson.—p. 338.

Healing of Renal Tuberculosis.—Regardless of whether renal tuberculosis is secondary to some preexisting tuberculous lesion in the body, the bacilli must be conveyed to the kidneys by the blood stream and therefore Reid believes that it is illogical to assume that infection by this route is not evenly distributed and consequently bilateral. The passage of time and natural resistance may obscure the initial bilateral distribution in some cases by reason of healing in one kidney. The development of renal tuberculosis depends primarily on the degree of resistance of the organism to the infection. It does not appear to be dependent on any local abnormality in the kidney. However, it is influenced in its progress by the supervention of secondary septic infection. It is probable that obstruction and secondary infection hasten the destruction of the kidney but not necessarily of the individual. Five cases of bilateral disease are reported; in three there was evidence of tuberculosis outside the genito-urinary system, while in the remaining two tuberculosis occurred first in the epididymis and then in the kidneys. Once infection of the kidneys has occurred, development and spread of the disease is dependent primarily on the resistance of the body to tuberculosis. Thus, renal disease differs essentially in no way from other forms of systemic tuberculosis. Resistance is dependent on the patient's natural resistance, reenforced by the well recognized therapeutic measures. Of these measures constitutional treatment holds the first place. Lett has pointed out that urinary tuberculosis should be treated on the principles that apply to tuberculosis in general. His concept marks a step forward in the management of the disease in the urinary system. Whether the presence of tubercle bacilli in the kidney urine is an indication for nephrectomy is a question that requires further study. The number of bacilli in the kidney urine bears no relation to the extent of the lesion; only careful urologic survey can define how far the destruction has progressed. If operation is decided on it should be an incident in the course of constitutional treatment, which must be sufficiently prolonged to raise the patient's resistance to the highest possible level.

British Medical Journal, London

2: 1215-1260 (Dec. 23) 1939

Hypertension: Consideration of Its Surgical Treatment. W. M. Craig.—p. 1215.
*Vitamin K Activity of 2-Methyl-1: 4-Naphthoquinone and Its Clinical Use in Obstructive Jaundice. J. M. Macfie, A. L. Bacharach and M. R. A. Chance.—p. 1220.
Simplification of Technic in Peroral Endoscopy. V. E. Negus.—p. 1223.
Treatment of Gastrointestinal Achalasia by Spinal Anesthesia. E. D. Telford and H. T. Simmons.—p. 1224.
*Diphtheria Prophylaxis: Review of Antigens and Methods Available. J. T. Lewis.—p. 1226.

Vitamin K and Obstructive Jaundice.—The results of the use of 2-methyl-1 : 4-naphthoquinone as a synthetic substitute for natural vitamin K that Macfie and his associates report are striking. The preparation when given to four patients with obstructive jaundice with low prothrombin indexes raised the index in all of them within two days. In the last case the change was evident within twelve hours. It is probable that the effect was present in the other cases at this early stage but the index was not estimated sooner. The rapidity of its effect suggests that it may be particularly valuable in the treatment of postoperative bleeding in jaundice.

Diphtheria Prophylaxis.—Because of the lack of uniformity in the current processes adopted in this country for controlling diphtheria by active immunization, Lewis reports the following study: With three fortnightly doses of 1 cc. of toxin antitoxin mixture 99 per cent of 2,163 children originally Schick positive became Schick negative. Alum precipitated toxoid was given to 1,039 children, 760 of whom were originally Schick positive and 279 were not given the Schick test previously. From eight to twelve weeks after the second injection 99 per cent of the 1,039 children were also Schick negative. The alleged tendency of alum precipitated toxoid to cause severe reactions was disproved by this study, as only forty-three of the children complained of discomfort. Thirty-five reactions were mild and occurred after the first injection of from 0.1 to 0.25 cc. of the toxoid and eight were severe, seven of which occurred after the first injection and one after the second injection. The results obtained by some workers with toxin antitoxin mixture and toxoid antitoxin floccules have varied widely, and those following the use of "one shot" alum precipitated toxoid have been so diverse as to make this method clearly untenable. All the reports of the use of two injections of alum precipitated toxoid are in accord with a consistently high Schick negative rate. Alum precipitated toxoid by two injections should have a more accredited place in immunization schemes. This method is now employed in more than 40 per cent of the studies investigated by the author.

Journal of Laryngology and Otology, London

54: 691-774 (Dec.) 1939

Acute Osteomyelitis of Superior Maxilla in Young Infants. N. Asherson.—p. 691.

Journal of Physiology, Cambridge

97: 133-272 (Dec.) 1939. Partial Index

Impulses in Pyramidal Tract. E. D. Adrian and G. Moruzzi.—p. 153.
Effect of Anterior Pituitary Extracts on Insulin Content of Pancreas. C. H. Best, J. Campbell and R. E. Haist.—p. 200.
Afferent Impulses from Teeth Due to Pressure and Noxious Stimulation. C. Pfaffmann.—p. 207.
Afferent Impulses from Teeth Resulting from Vibratory Stimulus. C. Pfaffmann.—p. 220.
Vascular Changes Affecting Transmission of Nervous Impulses. Edith Bülbring and J. H. Burn.—p. 250.
Amine Oxidase and Adrenalin. D. Richter and A. H. Tingey.—p. 265.

Lancet, London

2: 1299-1352 (Dec. 23) 1939

Dark Adaptation Test: Its Reliability as Test for Vitamin A Deficiency. L. J. Harris and M. A. Abbasy.—p. 1299.
*Relief of Intractable Pain in Carcinoma of Cervix Uteri. T. F. Todd.—p. 1305.
Strangulated Hernia. J. B. Hume.—p. 1308.
Sulfapyridine in Saliva. B. W. Fickling, P. Pincus and B. Boyd-Cooper.—p. 1310.
Perforated Peptic Ulcer: Analysis of 100 Consecutive Cases. A. H. Sangster.—p. 1311.
*Epidemic of Apparent Influenza. A. E. Martin and R. W. Fairbrother.—p. 1313.

Relief of Pain in Carcinoma of Cervix.—Two years ago Todd pointed out that two types of pain, visceral and somatic, were experienced in advanced carcinoma of the cervix uteri and that they could be differentiated clinically. The author investigated thirty-three cases: fifteen of visceral pain and eighteen of somatic. The treatment advocated was presacral neurectomy for visceral pain and intrathecal injections of absolute alcohol for somatic. When the appropriate method was used, the percentage of success was high. In the subsequent two years the author has continued this research in a further series of fifty-five cases. He now presents his observations on this second series. In investigating the cases a careful history and description of the pain is taken, a neurologic examination is made, examination under anesthesia, cystoscopy, sigmoidoscopy and exclusion of pyometra are done and roentgenography of the lumbosacral spine and pelvis and pyelography complete the investigation. Then an assessment is made of the type of pain and of the nerve path concerned. The author regards pain of sufficient severity to prevent sleep unless sedatives are administered as the most reliable indication of intractability. A week or even longer may be necessary for deciding whether the pain is minimal and the patient over-reacting to it. He is convinced that it is most important to have a precise objective phenomenon, such as interference with sleep, when attempting to assess and treat patients alleged to have severe pain. As regards visceral pain, the commonest cause is ulceration of the rectum, malignant involvement of the base of the bladder, or pyometra. As before, either direct local therapy or presacral neurectomy has almost always given relief. In cases associated with an advancing malignant process an alternative therapy to presacral neurectomy consists in injections of alcohol so administered as to

affect the upper lumbar roots, and the author thinks this will replace neurectomy in the malignant cases. Intrathecal injections of alcohol have been given in twenty-eight further cases of somatic limb pain. It could be confirmed that intrathecal injection of absolute alcohol is a valuable agent for the relief of intractable pain. The average duration of relief was three months. Two patients are still alive, having been treated over two years ago, and the relief has persisted, though in one the pain is beginning to recur. In conclusion it is stated that relief of intractable pelvic and lower limb pain associated with advanced cancer should be achieved satisfactorily in nearly 90 per cent of the cases. Failure to achieve relief probably indicates a technical imperfection or the presence of cord compression or is due to drug addiction. Changes in the nerve roots and spinal cords found at necropsy in two cases are recorded, and it is emphasized that injections of alcohol should be given only in the presence of malignant disease.

Epidemic of Apparent Influenza.—Martin and Fairbrother investigated seventy cases of apparent influenza which occurred during a mild epidemic in January and February 1939. Although in certain respects the outbreak resembled epidemic influenza, the evidence for concluding that the epidemic was not caused by the influenza virus is reasonably convincing. The virus was not isolated in typical cases by a technic which had succeeded on other occasions, and there was no increase in antibody titer of the serums of convalescent patients tested by complement fixation. The symptoms were, on the whole, uniform and simulated those of epidemics caused by the influenza virus. This tendency to uniformity suggests that probably one etiologic agent was responsible. It seems equally clear that this agent was not the influenza virus nor could a bacterial cause be demonstrated. The probability thus appears to be that the 1939 epidemic was caused by a virus which has not yet been isolated. The reactions obtained in some of the ferrets inoculated with material from such cases lends support to this view. It may be difficult clinically to differentiate cases of infection with the influenza virus from those caused by some other agent. Moreover, the high contagiousness and rapid spread of infection, even in a localized group, cannot be taken as a sure indication of the participation of the influenza virus in the outbreak. The investigation of this epidemic clearly establishes the necessity to search further for viruses other than the influenza virus which may be responsible for infections of the upper respiratory tract that occur in epidemic form and simulate clinical influenza.

Medical Journal of Australia, Sydney

2: 887-920 (Dec. 16) 1939

*Comparative Study of Rickettsial Strains from Infection of Ticks in Montana (United States of America) and from Q Fever. F. M. Burnet and Mavis Freeman.—p. 887.
Review of Physical Condition of 130 Returned Soldiers Suffering from Effort Syndrome. R. Whishaw.—p. 891.
Place of the Medical Man in the Preparation of an Army for War. E. L. Cooper.—p. 893.
Susceptibility to Diphtheria and Poliomyelitis. W. G. Heaslip.—p. 899.
Some Observations on Sciatica. N. Little.—p. 901.

2: 921-952 (Dec. 23) 1939

Some Backgrounds in Medicine. L. S. Latham.—p. 921.
Pyelitis, Medical Aspects. K. Maddox.—p. 927.
Pyelitis and Pyelonephritis from the Surgical Point of View. M. S. S. Earlam.—p. 931.
Place of Cesarean Section in Treatment of Placenta Praevia. A. J. Gibson.—p. 934.

Comparison of Rickettsial Strains of Ticks in Montana and Q Fever.—Burnet and Freeman find that the rickettsia isolated from ticks in Montana by Davis and Cox and from a laboratory worker by Dyer is immunologically indistinguishable from the rickettsia of Australian Q fever. The American strain, like the Australian strain, is pathogenic for guinea pigs, mice and two species of monkeys. It is of greater virulence for all three species, and if a large enough dose is administered it produces a fatal infection in guinea pigs. The authors believe that the two types should be included in the same species.

Tubercle, London

21: 41-80 (Nov.) 1939

Tuberculosis in Burma. S. L. Cummins.—p. 41.
Investigation of Value of Various Mediums for Primary Culture of Tubercle Bacilli from Tuberculous Material. E. Piasecka-Zeyland.—p. 56.

Annales de Dermatologie et de Syphiligraphie, Paris

10: 737-832 (Sept.) 1939

Tissular Diastases of Liver and Thyroid in Treatment of Eczema of Dogs. F. Maignon.—p. 737.
*Contribution to Clarification of Etiologic Problem of Induratio Penis Plastica. J. May.—p. 745.
Arsenical Encephalopathy. A. Tzanck and S. Lewi.—p. 752.
*Continuous Treatment of Pemphigus by Mercury Bichloride. E. Sonnenberg.—p. 771.

Etiology of Induratio Penis Plastica.—May directs attention to the possibility of finding a positive intradermal Frei reaction in cases of induratio penis plastica. He reviews a case presenting a sclerogenic process and lymphatic infiltrations on the dorsum of the penis, in which he first resorted to the Frei test. The reaction was positive and so the author decided to institute antigenotherapy against venereal lymphogranuloma. From the first injection the symptoms began to subside, the viscous secretion dried up quickly, the lymph nodes rapidly decreased in size and the induration of the corpus cavernosum receded slowly. The author cites additional cases observed by himself or by others. Until December 1938 he was able to collect forty-three cases; in thirty-eight of these the Frei reaction was positive and in five it was negative. He does not believe that venereal lymphogranuloma is the only etiologic factor of induratio penis plastica, which probably can be produced also by other infections. However, he thinks that venereal lymphogranuloma is the etiologic factor of induratio penis plastica in a comparable percentage of cases as it is the cause of rectal stricture.

Mercury Bichloride in Pemphigus.—In an extensive report, Sonnenberg reviews a case of pemphigus which was complicated by secondary infection. To counteract the offensive odor given off by the patient, which was probably caused by the presence of Staphylococcus pyogenes aureus, and because he had found intramuscular injections of mercury bichloride helpful in cases of furunculosis, he decided to resort to injections of mercury bichloride. The injections were given daily. During the first two weeks of this treatment the bullae became more transparent, the odor diminished, the skin became drier and islands of epidermis commenced to reappear. Later the patient's general condition improved; the appetite as well as the weight increased. Toward the seventh week of the application of mercury bichloride the last visible symptoms gradually disappeared. The favorable effects obtained with mercury bichloride in this case induced the author to employ it in other cases of pemphigus. Since 1932 he has used it in thirty-four cases of pemphigus; fourteen of the patients were men and twenty were women. The ages of the patients varied between 8 and 71. Chronic pemphigus vulgaris existed in twenty-four cases, pemphigus foliaceus in four and pemphigus vegetans in six. In twenty-four cases the first symptoms appeared on the mucous membranes, in ten on the skin. Ocular complications existed in twenty-two cases and enucleation of an eye became necessary in one case. Dystrophic deformations of the nails were encountered in fourteen cases. In three cases complete loss of hair was observed. The symptomatology varied considerably, although certain conditions were always found. Following a discussion of the theoretical justification of the use of salts of mercury in the treatment of pemphigus, the author raises the question as to what should be done after the termination of the acute phase of pemphigus and then describes his conception of the continuous treatment with mercury bichloride. Reports of cases in which the continuous treatment was employed indicate that the maintenance treatment with mercury bichloride consisted of one injection every week or every second week. Interruptions of these injections were followed by relapses which necessitated renewed hospitalization. In some cases the maintenance treatment was continued for several years.

Archives de Médecine des Enfants, Paris

42: 673-792 (Nov.-Dec.) 1939

Avitaminosis and Notion of "Terrain" (Especially in Their Relation with Dystrophies in Children). G. Mouriquand.—p. 673.
*Vitamin A in Treatment of Typhoid in Children. P. Giraud and A. Vallette.—p. 691.
Xerophthalmia and A-Avitaminosis. R. Clement and J. Delon.—p. 698.

Vitamin A in Treatment of Typhoid in Children.—Because patients with typhoid behave clinically like subjects with deficiency in vitamin A and because from the onset of typhoid the patients present biologic signs that accompany insuf-

ficiency of vitamin A, Giraud and Vallette reasoned that the administration of vitamin A might be of value in patients with typhoid. They administered vitamin A to patients either in the form of cod liver oil with at least 2,000 units per cubic centimeter in doses of from ten to twenty drops a day or by utilizing an injectable solution, standardized at 3 per cent of the active products, injected intramuscularly in doses of 0.25 cc. every two days. They employed vitamin A in seventy-one cases of typhoid. They admit that the general course of the disease is not greatly changed by this medication; nevertheless, the time required for cure seems to be somewhat shorter than usual. Furthermore, the general prognosis is more favorable, because the mortality rate in the cases treated with vitamin A was only 11 per cent whereas in comparable cases treated without vitamin A it was about 20 per cent. Cardiac and cutaneous complications have been less frequent and more benign; however, pulmonary, hepatic or nervous complications apparently have not been modified. The intestinal hemorrhages have been completely averted. Thus it is certain that the vitamin A exerted a favorable effect on the nutrition of the intestinal lining. The authors recommend the systematic employment of this treatment in the course of typhoid.

Journal Belge de Neurol. et de Psychiat., Brussels

39: 715-782 (Nov.) 1939

Visibility of Cystic Cavities of Cerebral Neoplasms by Means of Injections of Thorium Dioxide Sol. T. de Lehoczky.—p. 715.
Afferent Passages of Inferior Olivary Body. M. A. Gerebtzoff.—p. 719.
Toxic Polyneuritis Induced by Uliron. A. Leroy.—p. 729.
*Treatment of Migraine by Intramuscular Injections of Pentamethylenetetrazol. A. Leroy.—p. 735.
Projection of Anterior Nuclei of Thalamus into Interhemispheric Cortex. J. Stoffels.—p. 743.

Metrazol Therapy in Migraine.—Leroy reports three cases of migraine in which metrazol was successfully applied intramuscularly in doses varying, preferably, between 0.25 and 0.3 Gm. in a 10 per cent solution. One of the patients, aged 63, had suffered from migraine for fifty years. His attacks would occur every ten days together with violent headaches, vomitings and insomnia. Sixteen injections of from 0.2 to 0.3 Gm. were given during a period of four months, followed by a single injection of 0.3 Gm. about two months afterward. At the end of a further period of four and one-half months the migraine appeared only at monthly intervals in an attenuated form of light headache, sometimes accompanied with vomiting. The condition of another patient, aged 35 years, with anamnesis of migraine in the mother, dated back to only a few years. He was subject to monthly attacks, sometimes lasting two weeks, with the usual signs. A severe dietary regimen was unavailing. Four intramuscular injections of from 0.2 to 0.25 Gm. of metrazol were sufficient to cure the disease, correct constipation and normalize nutrition. The disease of the third patient, aged 42 years, also with anamnesis of migraine in the mother, had a background of neurasthenia, debility, tachycardia and marked anemia. Crises of migraine occurring once a week and increasing in violence set in, a year before treatment, with nausea and vomiting. The administration of fourteen injections usually of from 0.2 to 0.25 Gm. of metrazol progressively reduced the symptoms. Three months later the patient was feeling well and had had only one or two slight attacks. The author attributes the efficacy of metrazol in migraine to shock induced by the intramuscular administration of the drug but invites further study.

Confinia Neurologica, Basel

2: 321-380 (No. 6) 1939

Anatomoclinical Study of Striocerebellar Tremor with Bradykinesia (P. Marie-G. Levy) and with Cholesterosis of Spleen and Choroid Plexus. G. de Morsier and L. van Bogaert.—p. 321.
*Further Studies Concerning Role of Radicular Nerves in Human Tetanus. L. Benedek and A. Juba.—p. 345.
Regulatory Influence of Sympathetic on Brain Centers. L. Asher and N. Scheinfinkel.—p. 356.
New Trigeminal Reflex (Trigeminotympanic Reflex) on Basis of Self Observation. F. Zak.—p. 368.

Role of Radicular Nerves in Human Tetanus.—Benedek and Juba in an earlier report described the histopathologic aspects of ten cases of tetanus. In this paper they give an account of studies in four additional cases. The presence of contusions or wounds provided the prerequisites for the invasion of the anaerobic tetanus bacilli, and symptoms like lockjaw, stiffness of the neck and rigidity of the musculature were so pronounced in all four cases that the diagnosis could not be doubted. The histologic aspects in the first two cases were especially varied, in the third case negative and in the fourth case uncommonly extensive. In the first two cases the infiltrations of the radicular nerves, consisting chiefly of lymphocytes and leukocytes, were so considerable that in some places the connective tissue framework was completely filled by them. The radicular nerves presented the most serious changes, although in case 1 there existed an extensive and in case 2 a localized infiltration of the pia mater. There seems to exist a correlation between the duration of the disease and the histologic picture. In case 1 the disease lasted four days. The infiltrations, located in the radicular nerves and in the pia mater, were grave. In case 2, in which the disease lasted eight days, the infiltrations were less extensive, existing chiefly in the radicular nerves. In case 3, which had lasted ten days, no histologic changes were observable. All this confirms the opinion which the authors had expressed previously, that the gravity of the infiltration depends chiefly on the duration of the disease. Case 4, however, apparently is a contradiction, for in spite of its long duration (seventeen days) there remained sparse infiltrations in the fibrous sheaths of the radicular nerves and severe infiltrations in the pia mater. In all probability the infection in this case was particularly virulent. In this new series of cases, as in the earlier one, the lesions of the cells of the intervertebral ganglions were more severe than those of the motor elements of the spinal cord. The swelling of the axis cylinders of the radicular nerves was also common, while the myelin sheaths proved unimpaired in the authors' cases. They think that the infiltrations in the nervous system, particularly those in the connective tissue of the radicular nerves, are a manifestation of the increased activity of the reticulo-endothelial apparatus of the central nervous system.

Pediatria, Naples

47: 1005-1049 (Dec.) 1939. Partial Index

Congenital Nodular Syphilis of Lung: Anatomopathologic Study. M. Raso.—p. 1005.
*Sclerosis Tuberosa: Four Cases with Encephalography. R. Ruggeri.—p. 1040.

Sclerosis Tuberosa.—Ruggeri calls attention to the importance of sclerosis tuberosa from a pediatric point of view. He observed eight cases of the condition in institutions for children with mental deficiency. Four cases are reported. The disease was characterized by the typical symptoms (epilepsy, mental deficiency or idiocy, alterations of the skin or else leukoderma and Pringle's adenoma) in three cases. Epilepsy developed during the first months of life of the patients and it had resisted prolonged treatment with phenobarbital or bromides. The neurologic symptoms were scanty. One of the two patients who suffered from divergent strabismus showed a bilateral Babinski reflex. A patient had congenital luxation of the hip joint and valgus foot. The fourth patient showed all the typical symptoms but epilepsy. He had Pringle's adenoma and also Barlow's sebaceous adenoma of the scalp. In all four cases the blood, cerebrospinal fluid and urine were normal. The fundus of the eye was grayish during ophthalmoscopic examination in one case. Encephalography was performed in all cases. It gave normal encephalograms in two cases. In one case of the typical form it showed deformation and dilatation of the right ventricle, which was more acute when encephalography was repeated two years later. In the case presenting the atypical form of the disease encephalography showed deformation and dilatation of the lateral ventricles and the presence of growing tumors (lack of air filling) in the ventricles. The author emphasizes the importance of encephalography for the diagnosis of sclerosis tuberosa, especially in atypical forms of the disease.

Endokrinologie, Leipzig

22: 225-304 (Oct.) 1939

The Pars Intermedia of the Hypophysis in Man. W. Berblinger.—p. 225.
The Status Thyro-Adrenalis (M. B. Schmidt). H. Kothe.—p. 229.
*Diabetes Mellitus and the Hypophysis-Thalamencephalon System. G. Köhne.—p. 241.
Acromegaly and Nephritis: Case. K.-H. Riwoldt.—p. 255.

Diabetes Mellitus and the Hypophysis-Thalamencephalon System.—Köhne made postmortem examinations in twelve cases of diabetes. Special attention was paid to the hypophysis-thalamencephalon system. Changes were observed

in the pancreas in all cases, such as island atrophy, sclerosis, lipomatosis or inflammatory processes. In one case with acromegaly an eosinophil cell tumor of the anterior lobe of the hypophysis occurred. In one case of apparently extra-insular origin, necrosis in the anterior lobe of the hypophysis was observed. The author points out that the one sided conception of a central genesis of diabetes is too narrow and does not do justice to the complicated course of carbohydrate metabolism carried out by the synergistic action of several endocrine organs. However, this does not mean denying glycosuria of central origin. The author concludes that the cause of classic diabetes does not lie primarily in the hypophysis-thalamencephalon system.

Medizinische Klinik, Berlin

35: 1529-1560 (Dec. 1) 1939. Partial Index

Estimation of Functional Capacity of Heart. E. Wiechmann.—p. 1535.
Induction of Birth in Case of Retarded Onset of Labor. F. Engelmann.—p. 1538.
Indications for Blood Transfusion in Internal Medicine. U. Wetzel and Maria Watz.—p. 1541.
*Treatment of Asthenic Conditions with Desoxycorticosterone Acetate. H. Eitner.—p. 1544.

Desoxycorticosterone Acetate in Asthenic Conditions.—Eitner tried desoxycorticosterone acetate in 0.5 per cent oily solution in cases of asthenia with severe emaciation. The patients were given daily one intramuscular injection of 1 cc. of the oily solution, that is, 5 mg. of the drug. The nine cases reviewed were characterized by general debility, weakness and loss of weight. The total quantities of desoxycorticosterone acetate administered in these cases varied between 0.075 and 0.26 Gm. In some cases the treatment was limited to the administration of desoxycorticosterone acetate and the resulting increase in weight was rapid and continuous. In other cases the drug was given after the insulin-dextrose therapy had produced unsatisfactory results and here again the desoxycorticosterone acetate proved effective. The increase in weight that followed treatment with desoxycorticosterone acetate was accompanied by an improvement in the general condition and in the subjective complaints. It is important that the organism receive an adequate supply of foodstuffs but forced feeding is unnecessary. The fact that the administration of the drug succeeded in cases in which the customary methods failed suggests that insufficiency of this substance existed although the characteristic symptoms of Addison's disease were absent. On the other hand, there are cases of emaciation in which desoxycorticosterone acetate fails to act in this manner. The author hopes that further investigations on the resorption of fat and dextrose may perhaps make possible a more exact indication for the use of the preparation than was possible on the basis of merely clinical observations.

Zeitschrft für Hygiene und Infektionskr., Berlin

122: 125-248 (Oct. 21) 1939. Partial Index

Contribution to Measurement of Noise with Improved Noise Counter (Thorybometer) of Dold and Thiele. H. Thiele and K. Holzberg.—p. 125.
Relations Between Severity of Infection and "Clinical Picture" in Infections with Chilomastix Mesnili and Other Flagellates of Large Intestine. A. Westphal.—p. 146.
Experiments on Elimination of Vaccine Virus by Lymphatic Organs of Intestine of Rabbits with Special Consideration of Appendix in Connection with Problem of Biologic Function of Tonsils. P. Roth.—p. 159.
*Harmfulness of Aluminum Dust in Case of Respiratory Intake. O. Ehrismann.—p. 166.
Influence of Manganese on Body Weight and Propagation. O. Ehrismann.—p. 171.
*Duration of Immunity Against Diphtheria. J. Sigurjónsson.—p. 189.
Studies on Nutrient Mediums for Diphtheria Bacilli and Types of Diphtheria. B. Warnecke.—p. 199.
Resistance of Gray and White Mice Against Infection with Bacterium Ozaenae. F. Freytag.—p. 211.

Respiratory Intake of Aluminum Dust.—According to Ehrismann, aluminum which is taken in through the gastrointestinal tract is not harmful in the quantities which occur under ordinary conditions. In this report he considers the respiratory intake of aluminum dust. He describes observations on rabbits and guinea pigs, which for periods of many weeks were exposed daily for six hours to the inhalation of dust consisting of aluminum-bronze. Pathologic conditions were observed in none of these animals. It was observed that guinea pigs developed pneumonia after the inhalation of comparatively small quantities of lead oxide dust. Studies on the quantity of aluminum in the lungs revealed that slightly larger quantities were present in the lungs of the animals exposed to the aluminum dust than in those of the controls. Further experiments will be necessary to determine whether aluminum is absorbed by the pulmonary surface and is transported to other organs, although this appears improbable. The reported observations provide further proof of the harmlessness of aluminum even if it acts in the form of a dust on the upper and deeper respiratory passages. Large quantities of dust may cause annoyance and catarrhal reactions, but severe impairments and lesions that are specific for aluminum are not to be expected.

Duration of Immunity Against Diphtheria.—Sigurjónsson reports that diphtheria, which ordinarily is comparatively rare in Reykjavik, Iceland, increased during 1935 and protective immunization was employed for the first time on a large scale. In 1939 Schick tests were made on the school children to determine what degree of protection was still in existence four years after the immunization. Children between 7 and 12 who had not been immunized gave negative Schick tests on the average in 10.4 per cent of the cases. Comparison with the preliminary tests in 1935 disclosed that the immunity among the nonimmunized is about the same as it was at that time. Of 867 children who four years ago had been given two injections of toxoid that had been precipitated with aluminum hydroxide, 66.3 per cent were still Schick negative. Eight months after the immunization 95.4 per cent were negative. Of 483 children who had been given only one injection of the same toxoid, only 19.5 per cent were now Schick negative, and of 134 who were immunized by two injections of Ramon anatoxin that had been treated with formaldehyde, 26.12 per cent were Schick negative. Eight months after the immunization 80.7 per cent of this group were negative. A transition from a Schick-negative to a Schick-positive reaction took place in the course of four years in forty-six of 181 children (26 per cent) who had received two injections of the toxoid precipitate, in sixty of eighty-eight children (62.2 per cent) who had been given two injections of anatoxin treated with formaldehyde and in fourteen of twenty-eight children (50 per cent) who had become negative by latent infection. The author concludes that in Reykjavik the Schick immunity acquired naturally by children is weak and usually is temporary. The immunity obtained by inoculation was likewise of short duration in many cases. In the presence of such immunity conditions a single immunization is not enough for an effective prophylaxis of diphtheria. The Schick test is entirely adequate for epidemiologic purposes.

Ugeskrift for Læger, Copenhagen

101: 1467-1494 (Dec. 14) 1939

Insulin Shock Treatment, Its Basis and Physiologic Action. G. Magnussen.—p. 1467.
*Treatment of Epidermophyton Infection with Copper Iontophoresis. O. Jersild and Marie Plesner.—p. 1475.

Treatment of Epidermophyton Infection with Copper Iontophoresis.—Jersild and Plesner discuss seventy-nine cases of this infection treated since their first report on copper iontophoresis treatment. In sixty-six cases the disease was localized to the feet, in twelve to the hands and in one to the genitalia, hands and feet. In most of the cases the duration had been several months, in some, years. As a rule one or two treatments were effective, and in most cases an average of from five to six treatments sufficed; in a few instances ten or twelve treatments were necessary. Sixty-nine patients were discharged completely cured, eight still presented slight desquamation on discharge, and two left before ending treatment. No after-examinations have been made because of the difficulty in distinguishing between recurrence and reinfection.

101: 1523-1534 (Dec. 28) 1939

*Frequency of Pernicious Anemia in Aged. E. Kirk and H. Geert-Jørgensen.—p. 1523.
Case of Exanthem from Mercury. H. Boas.—p. 1525.

Frequency of Pernicious Anemia in Aged.—From their examinations of 2,079 persons aged from 60 to 96 in various old people's homes, Kirk and Geert-Jørgensen conclude that the frequency of pernicious anemia among old persons in Denmark is between 0.75 and 1 per cent.